Psychosis and aggression in childhood & adolescence investigations in clinically referred, inpatient and general population samples

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PhD Thesis, 2012

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Abstract

Background: Despite evidence of an increased risk of violence among adults with psychosis, little is known about the relationship between psychosis and aggression in young people. **Aim:** To compare clinical characteristics and associated features in young people with co-occurring psychosis and aggression to those with psychosis or aggression alone. **Hypothesis:** Those with both psychosis and aggression will share risk factors and correlates with both 'pure' groups. **Method:** Three samples were examined. The first (n=6,770), involved secondary data analysis and used information routinely collected on young people referred to the Maudsley Hospital over a 40 year period; the second study involved new data collection by the author, and focused on young people admitted to inpatient units (n=106); the third (n=2,232) involved secondary data analysis and used data from the Environmental Risk Longitudinal Twin Study, a non-referred community sample. **Results:** Comparisons of co-occurring cases with those with psychosis or aggression only suggested that co-occurring cases showed symptom profiles and risk factors typical of both 'pure' conditions; in addition, they had higher rates of callous/unemotional traits and parental antisocial behaviour than either 'pure' group. Independent predictors of psychosis and co-occurring aggression were low IQ, lower scores on theory of mind tasks, internalising problems, exposure to maltreatment, poor educational attainment and oppositional behaviour. **Discussion:** Consistent with the proposed hypothesis, young people with psychosis and co-occurring aggression shared risk factors and correlates with both 'pure' groups and showed some additional distinctive features. **Conclusions:** It is possible to identify psychosis and co-occurring aggressive behaviour in child and adolescent samples; many of the risk factors for the co-occurring pattern appeared similar to those identified in adult studies. **Implications for practice:** It may be possible to identify early risk factors for this dual pattern of difficulties that could inform risk assessment, prevention and early intervention strategies.

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Glossary of Acronyms

ADHD	Attention Deficit Hyperactivity Disorder
APD	Antisocial Personality Disorder
APSD	Antisocial Process Screening Device
ASD	Autism Spectrum disorders
CAMHS	Child and Adolescent Mental Health Services
CATIE project	Clinical Antipsychotic Trials of Intervention Effectiveness
CBCL	Child Behaviour Checklist
CD	Conduct Disorder
CFI	Comparative Fit Index
CU	Callous and Unemotional
DISC	Diagnostic Interview Schedule for Children
ECA study	Epidemiological Catchment Area
EE	Expressed emotion
E-Risk	Environmental Risk Longitudinal Twin Study
GAU	General Adolescent Unit
HPA	Hypothalamic-pituitary-adrenal
ICD-10	International Classification of Diseases

ICU	The Inventory of Callous-Unemotional Traits
K-SADS PL	The Kiddie-Schedule for Affective Disorders and Schizophrenia, Present and Lifetime Version
MAOA	Monoamine oxidase A (genotype)
MCVI	The MacArthur Community Violence Instrument
MSU	Medium Secure Unit
NESARC study	National Epidemiologic Survey on Alcohol and Related Conditions
NHSDA survey	National Household Survey on Drug Abuse
ODD	Oppositional Defiant Disorder
OR	Odds ratio
PAR%	Population-attributable risk percent
PCL: YV	Psychopathy Checklist: Youth Version
PCL-R	Psychopathy Check List-Revised
PTSD	Post-Traumatic Stress Disorder
TCO	Threat/control-override symptoms
TFI	Tucker-Lewis Index
ToM	Theory of mind
WLSMV	Weighted least squares estimation

Glossary of Key Terms

Psychosis	Within DSM-IV-TR (American Psychiatric Association, 2000), the following disorders are grouped together as psychotic disorders; schizophrenia, schizoaffective disorder, delusional disorder, brief psychotic disorder, shared psychotic disorder, psychotic disorder due to a general medical condition, substance induced psychotic disorder and psychotic disorder not otherwise specified. Psychotic symptoms are the prominent aspect of their presentation and can either be seen as representing an excess or distortion of normal function (positive symptoms) or a reduction or loss of function (negative symptoms).
Aggression	Physical acts towards others
Non-aggressive conduct problems	DSM-IV non-physically aggressive conduct disorder items (e.g. destruction of property, deceitfulness or theft and serious violation of rules).
Irritability	A mood symptom which refers to easy annoyance and touchiness.
Comorbidity	The co-occurrence of two or more psychiatric diagnoses.

Odds ratio	A measure of association between an exposure and an outcome. The OR represents the odds that an outcome will occur given a particular exposure, compared to the odds of the outcome occurring in the absence of that exposure. • OR=1 Exposure does not affect odds of outcome • OR>1 Exposure associated with higher odds of outcome • OR<1 Exposure associated with lower odds of outcome
Confidence intervals (95%)	A measure of the precision of a parameter estimate. The range within which we expect the true parameter to be with 95% confidence. A large confidence interval indicates a low level of precision, whereas a small confidence interval indicates a higher precision.
Multinomial logistic regression	A model used to predict the probabilities of the different possible outcomes of a categorical dependent variable, given a set of independent variables.
Risk factor	A measurable characteristic of each subject in a specified population that precedes the outcome of interest and increases the probability that the outcome will be observed.
Correlate	A factor that is shown to be associated with an outcome within a population.

Power	The sensitivity of the statistical test in detecting an effect. Power increases when the sample size and true unknown effect increase and when the inter-subject variability decreases.
Population attributable risk	Indicates the number (or proportion) of cases that would not occur if the factor were eliminated (e.g. the percentage of violence in the population that can be ascribed to schizophrenia/psychosis and therefore could be eliminated if schizophrenia was eliminated from the population).

Acknowledgements

I would like to thank my supervisor Professor Barbara Maughan for all her support and guidance and for taking a chance on me when I walked into her office all those years ago. I would also like to thank my second supervisor Dr Tamsin Ford for all her advice, kind words and encouragement.

For the Inpatient study, I would like to thank all the staff that allowed me access and took time out of their busy schedules to participate. To all those who assisted in data collection, dataset construction and data entry, a big thank you. Most importantly I would like to thank all the young people that participated in the study.

I am grateful to Professors Temi Moffitt, Avshalom Caspi and Dr Louise Arseneault for allowing me access to the E-Risk data and particularly for Dr Arseneault's time and helpful comments.

To Bonamy Oliver, Tina Kretschmer, Nicole Gideon, Jane Solomon, Maddy Iqbal, Sav Notay and Chris Greig for being great friends and always allowing me to vent my frustrations - a huge thank you.

A special thank you to my family who I believe still have no idea what the research entailed but were kind enough to provide financial support for the final year of the PhD. In particular, I would like to thank my parents for teaching me the value of hard work.

Finally, for the proof reading, the number checking, the cooked meals, the hours spent listening and for believing in me even when I didn't, a thank you that cannot express just how much I appreciate all that you did - to PB.

Publications

Published journal article

- Khalid, F.N., Ford, T., Maughan, B. (2012). Aggressive behaviour and psychosis in a clinically referred child and adolescent sample. *Social Psychiatry and Psychiatric Epidemiology*

  DOI: 10.1007/s00127-012-0480-2

Declaration

The research described in study two was funded by The Quality Network of Inpatient CAMHS, The Royal College of Psychiatrists, a membership run organisation supporting quality improvement within child and adolescent psychiatric in-patient care through service standards.

The research described in study three was undertaken as part of the Environmental Risk (E-Risk) Longitudinal Twin Study, a large collaborative twin project. The E-Risk study is funded by the Medical Research Council (MRC grant G9806489), with additional support from the Economic and Social Research Council (RS-177-25-0013), the British Academy, the Johan Jacobs Foundation, and the Nuffield Foundation. Data collection and dataset construction for the E-Risk dataset was completed by the E-Risk Study team.

For the Inpatient study (study two), I was responsible for data collection and dataset construction. For all studies, I was responsible for generating research questions, deriving variables from the datasets, conducting all statistical analyses and writing up the research for publication.

All work in this thesis is original and is my own work, except as acknowledged in the text. This thesis has not been submitted for any other degree at any other university.

Chapter 1

Psychosis and co-occurring aggression

1.1 Introduction

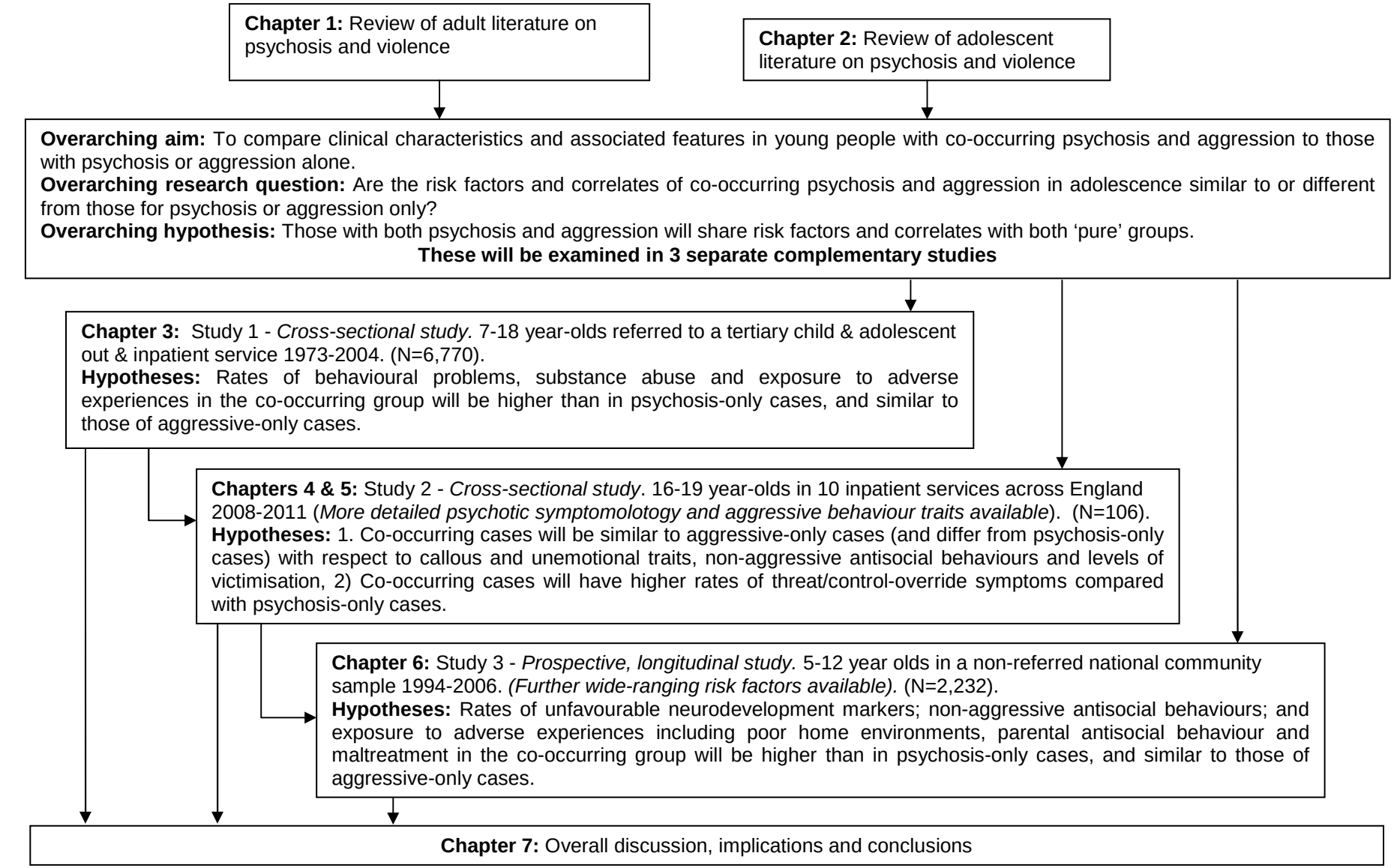
Historically there has been debate regarding the association between psychosis and violence. Until the early 1980s the consensus was that those with schizophrenia and other psychoses were no more likely than the general population to be violent (Monahan & Steadman, 1983). However, with further extensive research, including the use of large population-based studies since the 1990s, evidence now supports a moderate but consistent association between psychosis (in particular schizophrenia) and violence in adult samples (Kooyman et al., 2007; Taylor et al., 2008b; Wallace, Mullen & Burgess, 2004; Hodgins et al., 2008; Douglas, Guy & Hart, 2009; Fazel et al., 2009).

The issue of violence in those with psychosis remains topical in part because of its contribution to the stigma associated with mental illness (Torrey, 2011; Clark & Rowe, 2006). As a consequence it is important to note that the vast majority of patients with schizophrenia or other psychoses will never commit an act of severe violence, with only a small subgroup significantly more likely to be violent than members of the general population (Walsh et al., 2002). Nonetheless, aggression by individuals with severe mental illness may carry particularly worrying features. Family members are especially at risk as targets of aggression (Taylor, 2008a), and evidence suggests that perpetrators themselves are more likely to be victimised

(Fitzgerald et al., 2005), to decline further in social status (Aro, Aro & Keskimaki, 1995), to have impaired social relationships (Swanson et al., 1998), and to face homelessness (Folsom et al., 2005) or poor living conditions (Silver, Mulvey & Monahan, 1999) than other individuals with psychosis. Identifying risk factors for violence in this group is thus a key priority for both the safety of individuals with these difficulties and to those around them.

To date, however, very little is known about associations between psychosis and aggression in adolescent samples. Studies have consistently proposed continuity between early and adult-onset psychosis (Nicolson et al., 2000; Kryriakopoulos & Frangou, 2007), suggesting that examination of psychosis/aggression associations in childhood and adolescence could provide important pointers to risks for violence in adulthood. With this in mind, this thesis examines psychosis/psychotic symptoms and co-occurring aggression in child and adolescent samples. Chapters one and two provide a background to what is currently known about psychosis, aggression and the extent of the overlap in adult samples; theories of comorbidity; and explanations of risk factors and correlates of this dual pattern. Chapter three describes the first empirical study, investigating the relationship between psychosis and aggression in a clinically referred child and adolescent sample. Chapters four and five are the focus of the second empirical study which involved new data collection and examines the psychosis/aggression relationship in an adolescent inpatient sample. Chapter six discusses the third empirical study which utilises data from a prospective longitudinal general population sample and examines the relationship between psychotic symptoms in twelve year old children and aggressive behaviour and other risk factors assessed earlier in childhood. Finally, chapter seven presents the overall discussion, implications and conclusions. The next page provides a flowchart outlining the structure of the thesis.

Figure 1.1: Structure of thesis flowchart



1.2 Psychotic disorders

Within DSM-IV-TR (American Psychiatric Association, 2000), the following disorders are grouped together as psychotic disorders; schizophrenia, schizoaffective disorder, delusional disorder, brief psychotic disorder, shared psychotic disorder, psychotic disorder due to a general medical condition, substance induced psychotic disorder and psychotic disorder not otherwise specified. These disorders are grouped together to facilitate the differential diagnoses of disorders that include psychotic symptoms as a prominent aspect of their presentation. Other disorders that may present with psychotic symptoms as associated features are 'mood disorders' such as major depressive disorder with psychotic symptoms and bipolar disorder with psychotic symptoms.

Most research on overlaps between severe mental disorders and violence has focused on schizophrenia. Schizophrenia is a complex and debilitating disorder which can frequently follow a life-long course. Although extremely rare before the age of 10, the incidence of schizophrenia slowly rises through adolescence and peaks in early adult life (Hafner & Nowotny, 1995; Remschmidt et al., 1994). Until the 1990s, there was doubt about the validity of diagnosing schizophrenia in children and younger adolescents. However in DSM-III (American Psychiatric Association, 1994) and ICD9 (World Health Organization, 1978) the separate category of childhood schizophrenia was removed and the same diagnostic criteria were applied across the age range. The Maudsley Child and Adolescent Psychosis Follow-up Study (Hollis, 2000) has provided good evidence for the validity of the diagnosis of schizophrenia in childhood and adolescence. Hollis (2000) was able to show that schizophrenia in childhood and adolescence predicted a significantly poorer adult outcome compared

to other non-schizophrenic psychosis. In other samples, researchers were also able to demonstrate that the diagnosis of schizophrenia showed a high level of stability, with 80% having the same diagnosis recorded at adult follow-up (Jarbin, Ott & van Knorring, 2003).

1.2.1 Clinical features of schizophrenia

Symptoms in schizophrenia can either be seen as representing an excess or distortion of normal function (positive symptoms) or a reduction or loss of function (negative symptoms). Positive symptoms include hallucinations; delusions; passivity phenomena; thought disorder; disorganised behaviour and inappropriate affect. Negative symptoms include poverty of thought and speech; blunted affect; impaired volition, and social withdrawal.

Hallucinations manifest in the form of visual, olfactory, tactile and auditory hallucinations. The last (hearing voices) are the most common in schizophrenia with their content usually being derogatory, commanding or threatening in nature.

Delusions are false beliefs arising from incorrect inference about external reality not open to reason. Particularly common delusions in schizophrenia include paranoid delusions (belief that one is persecuted); delusions of reference (belief that events or other people's behaviour refers to oneself); and delusions of control (belief that one's own thoughts, beliefs, emotions are controlled by external forces).

Passivity phenomena consist of symptoms of thought broadcast (one's own thoughts automatically becoming available to others); thought insertion (alien thoughts being inserted into one's own mind); and thought withdrawal (one's thoughts being removed from one's mind).

Disordered thought and speech can include loosening of associations (incoherent speech) and/or poverty of speech (neologisms or lack of content and ideas).

Reduced/inappropriate emotional reactivity and lack of volition are demonstrated through flattened affect (reduced emotional expression), inappropriate emotional reactions, lack of drive and social withdrawal.

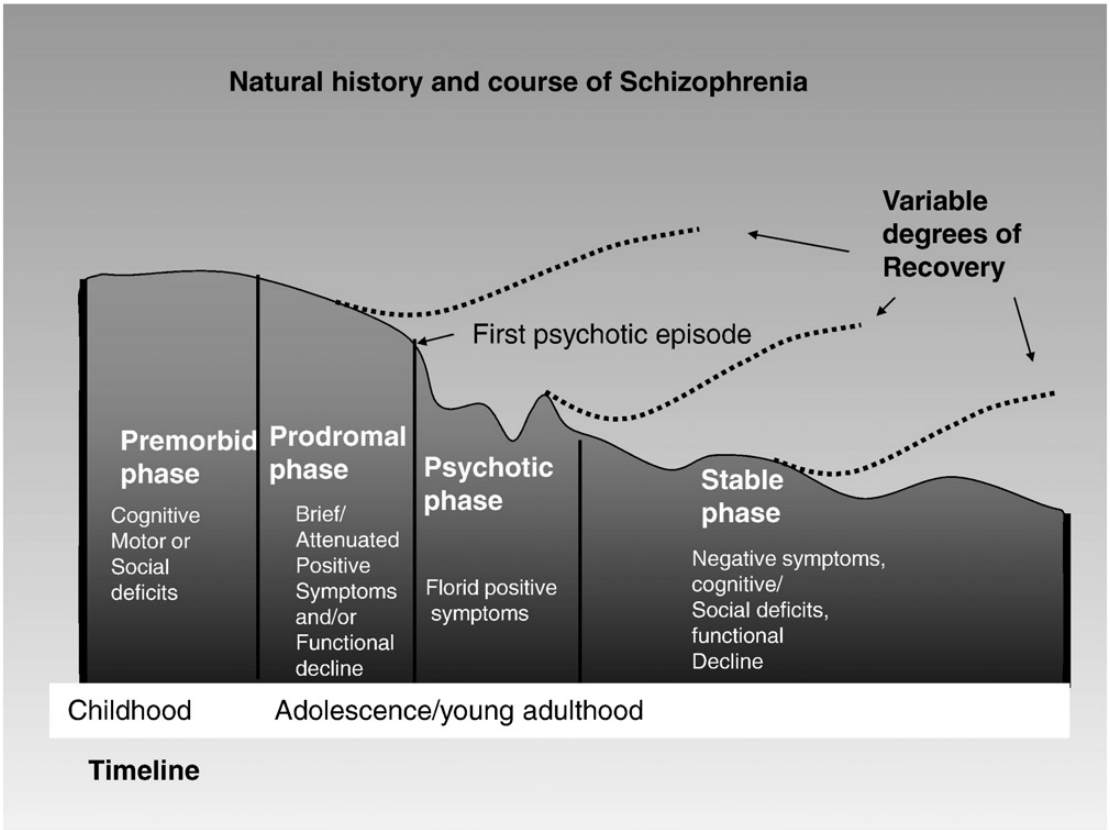
Motor abnormalities can comprise of posturing, mannerisms, stereotropies and catatonic immobility or excitement.

Clinical phases of schizophrenia

As shown in figure 1 (adapted from Tandon et al. 2008), schizophrenia is typically characterised by a sequential trajectory of four phases. It is important to note though that demarcation of these phases is imprecise and there is enormous variation in the progression of the illness across patients. Firstly, the *premorbid phase* involves nonspecific cognitive, motor and/or social dysfunctions which are generally believed to be risk factors for developing psychosis. Secondly, the *prodromal phase* is characterised by the early manifestation of the actual disorder through brief experience of positive symptoms or basic symptoms and declining function. Of note, however, is that over half of individuals with psychotic symptoms indicative of the psychosis prodrome do not go on to develop psychosis. Thirdly, the *first psychotic episode* is recognised as the formal onset of psychosis, generally marked by repeated episodes of psychosis with partial and variable degrees and duration of remission. However, the onset of the "initial psychotic episode" can be insidious or ill defined and psychotic manifestations are often not clearly episodic. Finally, in the *stable phase* psychotic symptoms are less prominent, with negative symptoms and stable cognitive deficits becoming increasingly predominant. Recovery of varying degrees can occur at any stage of the illness, with a significant proportion of

individuals with schizophrenia exhibiting substantial improvement (Schenkel and Silverstein, 2004; Schultze-Lutter, 2009; McGlashan and Fenton, 1993; Harding et al., 1987).

Figure 1.2: Progression of schizophrenia with phases of illness (Tandon et al. 2008)



Although these clinical features and phases are generally indicative of schizophrenia regardless of age of onset, it is important to highlight features specific to early onset schizophrenia. Child and adolescent onset schizophrenia is associated with poor premorbid functioning and early developmental delays (Hollis, 2003). Similar findings have been reported in adult onset schizophrenia but premorbid impairments tend to be more common and severe in child and adolescent onset cases. Significant early delays in language, reading, and bladder control were found in the Maudsley study of child and adolescent onset psychosis (Hollis, 2003). Language and motor

developmental delays have also been reported in individuals who develop schizophrenia in adult life but to a lesser degree (Jones et al., 1994).

In addition, Hollis (2003) reported that a third of cases presenting with schizophrenia also experienced impaired sociability. Young people displayed significant difficulties in social development that affected their ability to make and keep friends. In addition, lower levels of IQ were observed, with one third of child and adolescent cases having an IQ < 70, and with the whole distribution of IQ shifted down compared to that observed in both affective psychosis and adult schizophrenia. Cannon et al. (2002) reported a specific relationship between adult schizophreniform disorder and an antecedent pattern of childhood pan-developmental impairments involving motor development, receptive language and IQ. These findings are consistent with the view that premorbid impairments are manifestations of a genetic and/or developmental liability to schizophrenia.

For child and adolescent onset schizophrenia, the prodromal phase is typically characterised by a gradual but marked decline in social and academic functioning that precedes the onset of active psychotic symptoms. An insidious deterioration prior to the onset of psychosis is typical of the presentation of schizophrenia in children and adolescents and is more common in schizophrenia than in affective psychosis (Werry et al., 1994). Non-specific behavioural changes which tend to be early negative symptoms include social withdrawal, declining school performance and uncharacteristic and odd behaviour which can begin (on average) over a year before the onset of positive psychotic symptoms. Early recognition of the disorder is difficult as premorbid cognitive and social impairments gradually shade into prodromal symptoms before the onset of active psychotic symptoms. Prodromal

symptoms can include: odd ideas, eccentric interests, changes in affect, unusual experiences, and bizarre perceptual experiences (Hollis, 2008).

Even when strict adult definitions of schizophrenia (DSM IV / ICD 10) are applied, there are age-dependent variations in phenomenology. Child and adolescent onset cases are typically characterised by a more insidious onset, negative symptoms, hallucinations in different modalities and fewer systematised or persecutory delusions (Green et al., 1992; Werry et al., 1994). Characteristics of early onset schizophrenia include greater disorganisation (incoherence of thought and disordered sense of self) and more negative symptoms, while later onset cases display a higher frequency of systematised and persecutory delusions (Hafner & Nowotny, 1995).

1.2.2 Prevalence of schizophrenia and other psychosis

In a recent meta-analysis of all published studies between 1965 through 2001, McGrath et al. (2008) systematically reviewed 188 studies of the prevalence of schizophrenia from 46 countries. Of the 132 general population-based studies, they identified 21 that provided estimates of point prevalence, 34 for period prevalence, 24 for lifetime prevalence and 9 studies for lifetime morbid risk. The median values per 1,000 persons (10, 90 percent quantiles) for the distributions were, point prevalence 4.6 (1.9, 10.0), period prevalence 3.3 (1.3, 8.2), lifetime prevalence 4.0 (1.6, 12.1), and lifetime morbid risk 7.2 (3.1, 27.1). Combined prevalence estimates suggested there were no significant differences 1) between males and females or 2) between urban, rural, and mixed sites. The prevalence of schizophrenia in migrants was higher compared with native-born individuals: the migrant to native born ratio median (10, 90 percent quantiles) was 1.8 (0.9, 6.4). The distribution of prevalence estimates differed significantly when sorted by economic status, with developed countries

having higher estimates than less developed economies (median estimates: 3.3 vs. 2.6 per 1,000).

Population-based incidence figures for child and adolescent-onset psychosis are limited. Prevalence figures have been calculated in two studies. First, Gillberg et al, (1986) calculated age-specific prevalence rates for all psychoses (including schizophrenia, schizophreniform disorders, affective psychosis, atypical psychosis and drug psychosis) in the age range of 13-18 years using case-register data from Sweden. At age 13 years, the prevalence for all psychoses was 0.9 per 10,000, with a steady increase during adolescence, reaching a prevalence of 17.6 in 10,000 at age 18 years. A more recent study in Scotland (Boeing et al. 2007), examined the prevalence of adolescent onset psychosis for all young people aged under 18 years who received services from NHS trusts, education and social work departments. The 3-year prevalence was 50 per 100,000 adolescents at risk, indicating how rare the disorder is in the adolescent age range.

1.2.3 Self-reported psychotic symptoms in the aetiology of psychosis

Alongside studies of diagnostically-defined disorders, dimensional models of schizophrenia point to the existence of psychotic symptoms in the general population, below the threshold for diagnosis of the illness (van Os et al. 2000). Sub-diagnostic symptoms are common in the general population of adults (Johns et al., 2004; Wiles et al., 2006; van Os et al., 2009), and evidence suggests that such symptoms are associated with the same genetic and non-genetic risk factors as the clinical disorder (van Os et al. 2009; Lataster et al., 2009; Dutta et al., 2007). Sub-diagnostic symptoms are thought to signal the mild end of a risk continuum for which schizophrenia or psychotic disorder is the extreme point (van Os et al., 2009; Dutta et

al., 2007); progression from symptoms to clinical disorder is not inevitable and most likely depends on inherited susceptibility and exposure to environmental risks during development (van Os et al., 2009).

To date, the dimensional model has primarily focused on symptoms in adulthood, and it is not known whether or how related childhood symptoms should be incorporated into dimensional approaches. Recent research has, however, identified a strong association between self-reported psychotic symptoms in childhood and later schizophrenia. Analysing a New Zealand longitudinal birth cohort, Poulton et al. (2000) found that children who self reported psychotic symptoms at age 11 were 16 times more likely to be diagnosed with a schizophreniform disorder at age 26 than children who answered “no” to all questions. In addition, Cannon et al. (2002), using the same sample, found psychotic symptoms were also associated with early developmental deficits of motor development, language, and intelligence - skills that have often been found to be impaired among individuals who develop schizophrenia. Taken together these findings are consistent with the possibility that childhood psychotic symptoms signal neurodevelopmental processes that increase the risk for schizophrenia onset in adolescence or adulthood. Other studies have examined associations between self-reported psychotic symptoms in childhood and a range of individual correlates, including perinatal complications (Zammit et al. 2009), paternal age (Zammit et al. 2008), low IQ (Horwood et al. 2008) childhood trauma (Kelleher et al. 2008) peer victimisation (Schreier et al. 2009) and behavioural problems (Laurens et al. 2007). A recent study extended this work by testing the hypothesis that children who reported psychotic symptoms would be characterised by the same extensive network of risk factors and correlates previously reported in the research literature on adult schizophrenia. Using a prospective longitudinal birth cohort of

twins (one of the samples to be used in this thesis), Polanczyk et al. (2010), found that a significant minority of 12 year olds in the community self-reported hallucinations and delusions. In addition, these symptoms were associated with many of the same risk factors and correlates as adult schizophrenia, including genetic, social, neurodevelopmental, home-rearing, and behavioural risks. These findings suggest that the continuum model of psychosis may apply to preadolescents, as well as to the adults for which it was developed.

1.3 Aggressive Behaviour

1.3.1 Definitions of aggression and antisocial behaviour

Anger, hostility and aggression are central concepts of many theories of personality; however they are not always clearly defined or differentiated in the literature. In an attempt to differentiate between them, Howells (1988), described anger as a subjective state of emotional arousal, hostility as an attitude or a longer-tem negative evaluation of people or events and aggression as overt behaviour involving harm to another person, but went on to acknowledge that the terms are inter-related. Spielberger, Jacobs Russell and Crane (1983) attempted to differentiate anger from hostility and to take into account a state-trait dimension of anger. They argued that anger could be conceptualised either as an emotional state which varies in intensity or as a relatively stable personality trait. State anger was defined as a transitory emotional-physiological condition consisting of subjective feelings and physiological activation which is experienced along a continuum from little or no anger through mild to moderate emotions such as irritation, annoyance, and frustration to highly emotionally charged states such as fury and rage; state anger is thus characterised

as an emotional condition that occurs in response to an immediate situation, varies in intensity, and fluctuates over short periods. On the other hand, trait anger was defined in terms of a stable personality dimension of anger proneness or the tendency to experience more frequent and more intense state anger; that is high trait anger individuals experience more intense state anger. Trait anger, therefore, is described in terms of individual differences in the frequency that state anger is experienced over time, therefore presumably reflecting a more stable predisposition towards anger.

A widely used definition of aggression in the literature is behaviour deliberately aimed at harming people and/or objects physically e.g. by kicking (Dodge, 1991). The terms aggression and violence are often used synonymously. Although definitions of violence/aggression have varied in adult studies of psychosis and aggression/violence, many studies have been concerned with physical acts towards other people that cause demonstrable harm (Monahan et al., 2001). In keeping with the adult literature, the aim of the research described in this thesis was also to focus on physical aggression.

A number of distinctions of aggression have also been put forward which include hostile vs. instrumental aggression; hostile aggression has been defined as behaviour motivated by anger and instrumental aggression has been described as aggressive behaviour directed toward removing or evading an obstacle that stands between an aggressor and a goal (when such behaviour is not motivated by angry feelings) (Rule, 1974). This distinction is similar to that drawn elsewhere in the literature between impulsive and non-impulsive aggression (Vitiello & Stoff, 1997). Dodge & Coie, 1987 introduced the distinction between reactive and proactive

aggression in children. Reactive aggression was characterised as a response to a perceived threat or provocation whereas proactive aggression was described as behaviour that anticipates a reward.

As aggressive behaviour can occur in the context of other types of antisocial behaviour, the two terms are often aggregated, (Tremblay, 2000). The next section will focus on standardised diagnostic disorders of Antisocial Personality Disorder, Conduct Disorder and Oppositional Defiant Disorder which incorporate both aggressive and non-aggressive behaviours under their umbrella terms.

1.3.2 Standardised diagnostic definitions of Oppositional Defiant Disorder, Conduct Disorder and Antisocial Personality Disorder

Depending on an individual's age, and the type and severity of the aggressive/antisocial behaviour displayed, according to (DSM-IV-TR (American Psychiatric Association, 2000)), an individual may receive a diagnosis of either *Antisocial Personality Disorder* (APD) pertaining to adults; *Conduct Disorder* (CD) generally occurring in early childhood or adolescence, or *Oppositional Defiant Disorder* (ODD) often reported in very young children. Definitions of each will be briefly examined in turn. According to current diagnostic criteria, APD can only be diagnosed in individuals aged 18 or over. Behaviours include a failure to conform to social norms including laws, repeated fights or assaults, reckless disregard for the safety of self and others, and traits of impulsivity or failure to plan ahead, irritability, irresponsibility and lack of remorse. An essential feature of APD is that a pervasive pattern of disregard for and violation of the rights of others that begins in childhood or early adolescence and continues into adulthood. As a consequence, evidence of CD must be present before the age of 15.

CD is defined as a repetitive and persistent pattern of behaviour that violates the rights of others or in which major age-appropriate societal norms or rules are violated. The symptoms of the disorder fall into four main categories: (a) aggression to people and animals, (b) destruction of property, (c) deceitfulness or theft, and (d) serious violations of rules (e.g., truancy, running away from home). The disturbance of behaviour must cause clinically significant impairment in social, academic, or occupational functioning. While by definition all adults with APD have a childhood history of CD, studies suggest that only approximately half of young people with CD go on to develop APD (see e.g. Simonoff et al. 2004), raising important questions about the particular features that characterise young people with emerging severe personality disorders (Vizard et al., 2004; Vizard, Hickey & McCrory, 2007). As well as CD, ODD is also categorised as a childhood disruptive disorder. Of note here are differences in the classification of childhood disruptive disorders in the DSM and ICD systems. Whereas DSM-IV-TR differentiates ODD and CD, ICD-10 (World Health Organization., 2007) includes ODD under CD and provides the following definition: 'conduct disorder usually occurring in younger children, primarily characterised by markedly defiant, disobedient, disruptive behaviour that does not include delinquent acts or the more extreme forms of aggressive or dissocial behaviour'. Behavioural criteria for ODD include: angry and resentful, loses temper, argues with adults, defies and refuses to comply with requests and rules, annoys people, blames others, touchy and annoyed, spiteful or vindictive. Historically, it has generally been accepted that ODD and CD may be different age-related manifestations of the same condition, in which early ODD often develops into eventual CD (Lahey et al., 1997; Loeber, Burke, Lahey et al., 2000). Recently however, ODD has attracted new interest with reporters noting that treating ODD primarily as a precursor to behavioural disorders may be a somewhat limited approach. Evidence is accumulating that ODD predicts to

emotional as well as behavioural disorders in childhood and adolescence (Loeber et al., 2009) and early adult life (Copeland et al., 2009). In addition, recent studies have separated "headstrong" and "irritable" dimensions of ODD symptoms, and longitudinal data have shown that whereas the former dimension predicted CD, the latter predicted emotional psychopathology (Stringaris & Goodman, 2009a).

Heterogeneity in CD

It has also been argued that CD itself is a heterogeneous disorder (Frick & Ellis, 1999). One widely accepted distinction is based on age at onset, and differentiates childhood (prior to age 10) and adolescent onset (between ages 10 to 18 years) (Moffitt, 1993). More recently, Frick (2012) has proposed there are at least three important pathways through which children and adolescents can develop CD. Firstly, *adolescent-onset CD* (in line with the adolescent-subtype outlined above) represents a group that tends to show less aggression and violence in adolescence and is less likely to continue to show antisocial and criminal behaviour into adulthood compared to other youths with CD. This group is also less likely to show neuropsychological deficits (e.g., deficits in executive functioning), cognitive deficits (e.g., low intelligence), and temperamental/personality risk factors (e.g., impulsivity and problems in emotional regulation) compared to other youths with CD. In addition, they are also less likely to come from homes with family instability, family conflict, and parents who use ineffective parenting strategies; but tend to show higher levels of rebelliousness and are more rejecting of conventional values when compared to other children with CD (Dandreaux & Frick, 2009; Moffitt et al., 1996).

The second pathway is *CD with significant callous-unemotional traits*. This childhood-onset pathway is distinguished by the presence of significant levels of callous-

unemotional (CU) traits which are similar to those often used to define the construct of psychopathy in adults (Hare & Neumann, 2006; Patrick, 2006). Those with significant levels of CU traits appear to be only a minority of children in the childhood-onset group (Christian et al., 1997; Kahn et al., 2011; Rowe et al., 2009), albeit a clinically important group. Specifically, antisocial youths with CU traits show deficits in the processing of negative emotional stimuli as well as deficits in their reactivity to signs of fear and distress in others. They are insensitive to punishment, tend to be more fearless and thrill seeking, show more positive outcome expectancies in aggressive situations with peers and show lower levels of anxiety compared to other young people with similar levels of conduct problems. In addition, the conduct problems of youth with CU traits are less strongly related to hostile and inconsistent parenting practices. Based on these findings, one hypothesis is that children and adolescents with CU traits appear to have a temperament that can impede normal development of conscience and place the child at risk for a particularly severe and aggressive pattern of antisocial behaviour (Frick & Viding, 2009).

The third pathway that has been proposed is *CD associated with emotional and behavioural dysregulation,* which also has its onset prior to adolescence. In particular, children with CD but without CU traits typically do not show problems in empathy and guilt but display high rates of anxiety and distress because of the effects of their behaviour on others (suggesting no deficits in conscience development). However, this group of youths with CD do show high levels of impulsivity, deficits in verbal intelligence, hostile attribution bias in social situations, and are more likely to come from families with high rates of hostile and inconsistent parenting practices. Further, this group without CU traits tends to be less aggressive overall, and when they are aggressive, it is often confined to reactive forms of

aggression (i.e., in response to real or perceived provocation). Specifically therefore, the antisocial and aggressive behaviour of those children with childhood-onset CD but without significant levels of CU traits is thought to involve deficits in the cognitive or emotional regulation of behaviour. These deficits combined with inadequate socialising experiences could result in the child committing impulsive and unplanned aggressive and antisocial acts for which they may be remorseful afterward but may still have difficulty controlling in the future (Frick & Viding, 2009).

1.3.3 Prevalence of conduct problems

Although estimates of the prevalence of conduct problems vary depending on the criteria used (Angold & Costello, 2001; Green et al., 2005) the majority of epidemiological studies have found that between 5% and 10% of children and adolescents have significant persistent oppositional, disruptive or aggressive behaviour problems. With respect to sex differences in prevalence, the ratio is approximately 2.5 males for each female overall, with males also more likely to exceed females in terms of severity and frequency of behaviours (Moffitt et al. 2001).

There is considerable continuity or stability of conduct problems across age. One prospective longitudinal study found 45% of children aged 4 to 12 years who had conduct problems at first assessment still had conduct problems four years later, compared with only 5% of those who had no disorder at Time 1. Stability was greater for children aged 8 to 12 years (60% persisting) than for children aged 4 to 7 years (25% persisting) (Offord et al. 1992).

Many studies have also examined differing developmental trajectories of conduct problems. Results from seven large longitudinal cohort studies of children from

Canada, the Netherlands, New Zealand and the US (Bongers et al., 2004; Broidy et al., 2003) found between 7% and 11% of school children were on a trajectory of chronic persistent aggression. That percentage tended to be higher for preschool children (Cote´ et al. 2007) and lower for adolescents (Brame, Nagin & Tremblay, 2001). This decrease with age corresponds to the general decrease in the frequency of physical aggression with age (Nagin & Tremblay, 1999). The current accumulated evidence suggests that the frequency of physical aggression generally decreases with age after a peak between ages 2 and 4 years; the seriousness of physical aggression generally decreases from 14 to 24 years; and the small group of individuals who increase in frequency and seriousness of aggression during adolescence are most likely to have been on the highest trajectory in terms of frequency and seriousness since early childhood (Tremblay, 2010).

Having outlined clinical features and prevalence rates of psychosis and aggression separately, the next section will focus on the extent of the overlap between psychosis and violence as reported in studies of adults.

1.4 The relationship between psychosis and aggression in adult samples

As outlined earlier, a large body of research has found psychosis (and schizophrenia in particular) to be moderately but significantly associated with an increased risk of aggressive behaviour. As well as being reported by several independent research groups in both industrialised and non-industrialised countries (Volavka et al. 1997), researchers have examined the association in a range of samples/settings including general psychiatric patients (Hodgins et al. 2008), medium and high secure settings

(Baxter, Rabe-Hesketh & Parrott 1999; Taylor, 2008a), follow-up studies comparing patients and their neighbours (Belfrage, 1998), samples of incarcerated offenders (Fazel & Danesh, 2002), complete cohorts of homicide offenders (Erb et al. 2001), population cohorts (Wallace et al., 2004), and prospective, longitudinal investigations of birth cohorts (Arseneault et al., 2000; Brennan et al., 2000; Tiihonen et al., 1997).

Three differing approaches have been used to examine the association between psychosis and violence in adult samples. Specifically, studies have focused on: 1. rates of violent acts in those with psychosis; 2. rates of psychosis in those who have committed violent acts and/or had contact with the criminal justice system, and 3. overlaps between psychosis and violence in community-based epidemiological samples. Research in this area is challenging with evidence varying at times with respect to the definition of psychosis/schizophrenia and the definition and measurement of violence. The following section summarises the strongest evidence available.

1.4.1 Violence in clinical samples

As part of the MacArthur Risk Assessment Study, Monahan & Applebaum (2000) estimated the prevalence of community violence in discharged psychiatric patients. Between 1992 and 1995, 951 patients aged 18 to 40 were followed after discharge from state and university psychiatric inpatient units in the USA. Participants were interviewed before discharge and re-contacted at their community residence every ten weeks for one year. Violence was measured from multiple sources including official records, and interviews with participants and family members using standardised validated tools. Of the 17% of patients with a diagnosis of schizophrenia, 9% were violent in the first 20 weeks after discharge. This compared

with a violence prevalence of 19% for depression, 15% for bipolar disorder, 17.2% for other psychotic disorders, 29% for substance misuse disorders and 25% for personality disorder. Although the study found that discharged patients diagnosed with schizophrenia were more likely to be violent than people in the non-patient comparison group, as can be seen here they were less likely to be violent than patients with other diagnoses. One speculative interpretation of these unexpected findings related to the possibility of selection bias, as 43.7% of individuals with schizophrenia refused to take part in the study, a significantly higher refusal rate than for people with other diagnoses.

Mullen et al. (2000), in Australia, studied two groups of patients with schizophrenia first admitted in either 1975 (before major deinstitutionalisation) or 1985 (when community care was becoming the norm). Compared with general population controls, both groups were significantly more likely to be convicted for all categories of criminal offending, except sexual offences (relative risk of offending in *1975* = 3.5, 95% CI 2.0-5.5, in *1985* = 3.0, 95% CI 1.9-4.9). The increased number of convictions in men with schizophrenia in the 1985 group (14.2%) compared with the 1975 (13.3%) group seemed to reflect a general increase in offending in those of a similar age, gender and place of residence (2.9% vs. 2.3%), suggesting no significant change in rates of conviction in schizophrenia due to community care.

Wallace et al. (2004), in a study of individuals convicted of offences in Victoria County, Australia compared the crime records of 1,689 men and 1,172 women with a first psychiatric admission in 1975, 1980, 1985, 1990, or 1995, with general population controls matched for age, sex, neighbourhood, and year. Overall, individuals with schizophrenia were four times more likely to have sustained a violent

offence conviction as compared to the general population. Individuals were more likely to have done so in the later than the earlier cohorts; however, the proportionate increase in offending over time was similar for the groups with and without schizophrenia. Consequently, deinstitutionalisation as such could not explain the increase in offending rates. Another explanation was the increase in rate of exposure to substances which had trebled for individuals with schizophrenia from 1975 to 1995. Significantly higher rates of violent offending were found for patients with schizophrenia and substances abuse problems than for patients with schizophrenia without substance abuse problems (26.1% vs. 4.4%).

Fazel et al. (2009) carried a systematic review of 20 individual studies (between 1970 to February 2009) that reported on risks of interpersonal violence and/or violent criminality in individuals with schizophrenia and other psychoses compared with general population samples. They found only five studies that compared risk of homicide in individuals with schizophrenia with the general population. The risk of homicide in individuals with schizophrenia (with and without substance abuse) was 0.3% compared with 0.02% in the general population. Although the risk of any individual with schizophrenia committing homicide was very small it did indicate a particularly strong association between psychosis and homicide.

1.4.2 Psychosis in samples of offenders

Several studies have investigated the prevalence of psychosis in prison populations, with evidence suggesting an over-representation of those with psychosis (Teplin, 1990; Fazel & Seewald, 2012; Wallace et al, 1998; Brugha et al., 2005). Fazel and Seewald (2012) carried out a systematic review of 81 publications (from 1966 to 2010) that used clinical examinations or semi-structured instruments to make

diagnoses on unselected prison samples. They identified 109 samples, including 33,588 prisoners from 24 countries. Prevalence figures for male and female prisoners with a psychotic illness were 3.7% (95% CI 3.2 - 4.1). These prevalence figures did not differ from a previous review carried out by Fazel & Danesh in 2002 which utilised 56 studies and found prisoners in the western world had a two to four fold increased risk of psychotic illness compared to the general British population of similar age. Fazel & Seewald (2012) did not find increased rates of psychosis in prisoners over time. In addition, this study found rates of psychosis in prisoners were significantly higher in low and middle-income countries than in high-income ones (5.5% in low–middle vs. 3.5% in high income nations).

In addition to the above, Brugha et al. (2005) found psychotic illness to be over 10 times higher among prisoners in England and Wales than in the general household population. Teplin (1990) compared the prevalence of schizophrenia in 728 male prisoners with that in the general population. The prevalence in the jail population (2.7%) was three times higher than that of the general population (0.91%). Wallace et al (1998), studied individuals convicted of serious offences in Victoria County, Australia. Using case linkage the authors searched for evidence of psychiatric contact on the county psychiatric register. Those with schizophrenia were found to be over four times more likely to be convicted of interpersonal violence and ten times more likely to be convicted of homicide than the general population.

Focusing on homicide, Erb et al. (2000) used official German records and studied 2 cohorts of individuals with schizophrenia who had committed or attempted homicide from 1955 to 1964 and from 1992 to 1996. Compared to the general population, schizophrenia increased the risk of homicide 12.7 times (95% CI 11.2–14.3) in the

1955 to 1964 cohort and 16.6 times (95% CI 11.2–24.5) in the 1992 to 1996 cohort. Similar to studies already outlined, although rates had increased over time there was no significant difference indicating that the risk of homicide by a person with schizophrenia had not changed during the previous three decades.

1.4.3 Psychosis and violence in community samples

In their seminal study, Swanson et al. (1990) used a sample of 10,059 adult residents from the Epidemiologic Catchment Area (ECA) study sites (representative sample surveys of household residents) (Eaton & Kessler, 1985) to examine the relationship between violence and psychiatric disorder. Eight percent of those with schizophrenia alone were violent compared with 2% of those without mental illness. Comorbidity with substance abuse increased this percentage to 30%. Van Dorn, Volavka & Johnson (2011), used data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), a two wave study (N = 34,653: wave 1: 2001–2003; wave 2: 2004–2005). Indicators of mental disorder in the year prior to wave 1 were used to examine violence between waves 1 and 2. This study also reported a strong association between violence and a diagnosis of schizophrenia (OR=5.97, 95% CI 1.71–20.88); and a stronger association between violence and a diagnosis of schizophrenia with substance abuse/dependence (OR=29.31, 95% CI 10.74–79.97).

Tiihonen et al. (1997) prospectively studied an unselected 1966 birth cohort (N=12,058) in Northern Finland until the end of 1992. The risk of violent offences among males with schizophrenia was significantly higher (OR=7.0, 95% CI 3.1–15.9) than controls with no mental disorder. Using a Danish prospective birth cohort, Brennan, Mednick, & Hodgins (2000) reported that both men with schizophrenia (OR=4.6, 95% CI 3.8-5.6) as well as women with schizophrenia (OR=23.2, 95% CI

14.4-37.4) were significantly more likely to be arrested for criminal violence than were persons who had never been hospitalised, even after controlling for demographic factors, substance abuse, and personality disorders. Arseneault et al. (2000) studied the past year prevalence of violence in 961 young adults who constituted 94% of a total city birth cohort in New Zealand. Three Axis 1 disorders were uniquely associated with violence after controlling for demographic risk factors and all other comorbid disorders: alcohol dependence (OR=1.9, 95% CI 1.0-3.5), marijuana dependence (OR=3.8, 95% CI 2.2-6.8), and schizophrenic spectrum disorder (OR=2.5, 95% CI 1.1-5.7).

Psychotic symptoms in the community and aggression

In an effort to further extend research on the clinical significance of psychotic symptoms in the community, Mojtabai (2006) examined the association between 'psychotic-like experiences' and interpersonal violence in population data from the 2001 US National Household Survey on Drug Abuse (NHSDA) (n=38,132). Psychotic-like experiences were reported by 5.1% (n=2,584) of adults in the community. The presence of any psychotic-like experience was associated with an increased prevalence of interpersonal violence, including attacking someone with the intent of hurting that person (OR=5.72, 95% CI 4.44–7.38), intimate partner violence (OR=4.97, 95% CI 3.68–6.71), arrests for aggravated assault (OR=5.12, 95% CI 2.76–9.53), and arrests for other types of assault (OR=3.65, 95% CI 2.18–6.11). Furthermore there was a dose–response association between the number of psychotic-like experiences reported and violent behaviours; the greater the number of experiences reported, the greater the odds ratio of violence. Unusual perceptual experiences and paranoid ideations were most consistently associated with violence.

As outlined earlier, prospective longitudinal studies have been able to take a dimensional approach to psychosis and have found that children as young as 11 who displayed psychotic-like symptoms were subsequently at increased risk of developing schizophreniform disorder (Poulton et al. 2000). Emerging literature has not only been able to show this strong linear relationship between self-reported psychotic symptoms in childhood and adult schizophreniform disorder but also that children in the community self-reporting hallucinations and delusions share many of the same risk factors as adults with schizophrenia (Polanczyk et al. 2010). Robust evidence for the association between psychotic-like symptoms of this kind and aggression was provided through one study using a birth cohort. Arseneault et al. (2003) found that participants with schizophreniform disorder at age 26 were more likely to be violent than participants without, even after controlling for socio-demographic variables and concurrent substance dependence disorders. Childhood psychotic-like symptoms were a strong risk factor for violence in adults with schizophreniform disorder, as was childhood physical aggression (measured at ages 7, 9 and 11), although to a lesser extent.

1.4.4 Population attributable risk

In addition to examining the prevalence of violence in samples with mental disorder, the association between violence and schizophrenia can be expressed in terms of population-attributable risk percent (PAR%), which is the percentage of violence in the population that can be ascribed to schizophrenia/psychosis and therefore could be eliminated if schizophrenia was eliminated from the population. In their systematic review, Fazel et al. (2009) identified four studies where population-attributable risk percentages could be calculated. In a Finnish birth cohort, it was estimated that 8.2%

of individuals reported to have engaged in violent crime between 1998 and 2001 had schizophrenia (Elonheimo et al. 2008). In a Danish birth cohort followed to age 44 years, estimates suggested 9.9% of males and females with lifetime arrests for violence had schizophrenia (Brennan et al. 2000). In a New Zealand birth cohort followed up at age 21 years; 8.4% of past-year violence committed by these young adults was attributable to schizophrenia spectrum disorders (Arsenault, 2000). Using case registers in the Australian state of Victoria, it was reported that 3.2% of all violent offences carried out over a 25 year period were by individuals with schizophrenia (Wallace et al. 2004). In addition, Fazel & Grann (2006) found over a 13-year period in Sweden, 5% of violent offences were committed by individuals with psychoses. In a UK household survey in 2000, it was estimated that 1% of violent incidents in the previous years were committed by individuals with psychosis (Coid et al. 2006). As these findings suggest, although estimates varied widely between countries and studies, the risk of violence in those with schizophrenia represented no more than 10% of the total violence in these populations.

1.5 Psychosis and co-occurring aggression in child and adolescent populations

Despite continuities between early and adult-onset psychosis (Nicolson et al., 2000; Kryriakopoulos & Frangou, 2007), and clear evidence that aggression is manifest from very early childhood (Tremblay, 2010), much less attention has been paid to overlaps between psychosis and aggression in child and adolescent samples. To our knowledge there is only one study that has examined the association between early onset psychosis and violence in an adolescent sample. Clare et al. (2000) conducted a retrospective study of 12–18-year-olds with a diagnosis of psychosis admitted to a national medium secure adolescent inpatient unit (n=18) and a regional adolescent

inpatient unit (n=21). They found 14 cases with evidence of violent offences (murder, attempted murder and armed robbery). Although this study has produced informative findings on risk factors for violence in these samples (discussed in chapter two), the absence of a non-referred or non-psychotic comparison group precludes use of these findings to estimate the extent of any increased risk of violence among young people with psychosis.

In order to further understand the relationship between psychoses and conduct problems/aggression it is important to delineate why they co-occur. In taking a developmental approach to psychosis/aggression links in childhood and adolescence it is important to be able to describe the course and correlates of co-occurring and 'pure' disorders. Consequently, the next chapter will discuss models of comorbidity and outline risk factors for and correlates of psychosis, conduct problems/aggression and their overlap, before outlining the research questions examined in this thesis.

Chapter 2

Psychosis and aggression: understanding the overlap

2.1 Models of comorbidity

Leading on from the last chapter, in order to understand why psychosis and aggression/conduct problems co-occur, it is important to understand conceptually why any two disorders or conditions may co-occur more frequently than would be expected by chance. With this mind, this chapter begins with a brief overview of work by Caron and Rutter (1991), who have suggested four possible explanations for higher than expected levels of co-occurrence between disorders.

First, *one disorder may create an increased risk for the other*. Processes of this kind might arise, for example, if one disorder plays a part in generating stress and adversity, which in turn constitute risk factors for a second, separate disorder. Second, overlapping disorders may *share the same risk factor or factors*. This possibility arises from the fact that many disorders are multifaceted in origin and that many causal factors are not diagnosis-specific. Third, there may be *overlap between risk factors*, such that the individual is at risk for two separate conditions with the risk mechanisms for each independent but co-occurring. For example, it might be suggested that the comorbidity between two disorders could arise, partly, because *disorder A* in a parent is associated with a genetically mediated risk for *disorder A* in

the offspring, and an environmentally mediated risk for *disorder B*. Finally, the comorbid pattern itself may *constitute a meaningful distinctive syndrome*. For example, it has been argued that comorbid depression and conduct disorder constitute a meaningfully different syndrome and that the depression in the comorbid group is secondary to or part of the conduct disorder (Simic and Fombonne, 2001).

These models will be explored further in this chapter to examine processes that may underlie associations between schizophrenia and violence. The next section will focus on the first model (that one disorder may cause an increased risk for the other), and subsequent sections will focus on the second and third models (that psychosis and aggression/conduct problems may share risk factors and/or there may be overlap between risk factors), first by examining risk factors for psychosis and aggression/conduct problems separately, and then by reviewing evidence from studies that have examined the conjoint pattern.

2.2 Models of comorbidity: one disorder may create an increased risk for the other

Recent commentaries focusing on findings in adult samples have proposed at least two routes whereby psychosis may be related to violence. First, in individuals with no past history of aggression, psychotic symptoms themselves may play a key role in increasing risk of violence. Second, however, studies have also identified sub-groups of individuals with histories of behavioural difficulties (possibly with diagnoses of conduct disorder) and exposure to childhood adversities that clearly pre-date the onset of their illness (Taylor et al., 2008a; Hodgins, 2008).

The next section will focus on these two presentations and discuss (1) the role of psychotic symptomotology in potentially increasing the risk for violence, and (2) conduct problems in childhood potentially increasing the risk for psychosis.

2.2.1 Psychotic symptomotology potentially increasing the risk for violence

There is considerable evidence to suggest that in some individuals the relationship between violence and schizophrenia is attributable to the presence of specific groups of psychotic symptoms, primarily those belonging to the class of positive symptoms (Angermeyer, 2000; Bentall & Taylor, 2006; McNiel, Eisner, & Binder, 2003; Swanson et al., 2006; Taylor, 2006; Taylor et al., 1998; Taylor, 1995). Delusional symptoms such as persecutory ideations (Swanson et al., 2006), persecutory delusions in combination with emotional distress (Bjørkly, 2002a; Freeman, Garety, & Kuipers, 2001), threat/control-override (TCO) symptoms (Link & Stueve, 1994; Bjorkly & Havik, 2003; Hodgins, Hiscoke, & Freese, 2003; Link et al., 1998), command hallucinations and hallucinations of threatening content (McNiel, Eisner, & Binder, 2000; Nolan et al., 2003) have all been found to be significant predictors of violence and aggression in patient samples.

Taylor et al. (2008b) compared complete national cohorts of high security hospital patients that were resident during the same time period in Scotland and in England. Comparing individuals with ‘pure’ psychosis and those with psychosis and comorbid personality disorder, the authors reported psychotic symptom drive (hallucinations and delusions) to the index offence was over four times more likely in the group with pure psychosis than the group with psychosis and comorbid personality disorder, regardless of sex, ethnicity, country of hospital or index offence.

Swanson et al. (2006) used data from the CATIE project (a randomised trial conducted between 2001 and 2004, at 57 clinical sites in 24 states throughout the United States) to examine 1,410 individuals with schizophrenia living in the community. They found that positive psychotic symptoms, such as persecutory ideation, were associated with an increased risk of minor and serious violence, while negative psychotic symptoms, such as social withdrawal, were associated with a lowered risk of serious violence.

Focusing on threat/control override symptoms, Link and Stueve (1994) first highlighted the TCO cluster as strongly correlated with violence. Their definition of TCO symptoms using the Psychiatric Epidemiology Instrument (PERI) (Dohrenwend et al., 1980) was three-fold, 1. feeling that one's mind is dominated by forces beyond one's control; 2. feeling that thoughts are being put into one's mind that are not one's own; 3. feeling that there are people who wish to do one harm. The authors compared patients and never-treated community control subjects and showed that TCO symptoms best differentiated individuals who had been violent from those who had not, regardless of demographic characteristics; however, symptoms and violence were measured at different times. In order to overcome this limitation, Swanson et al. (1996) replicated Link and Stueve's study using data on a larger community sample (the ECA study), and confirmed the original findings: participants who reported TCO symptoms were overall twice as likely to engage in assaultive behaviour as those with hallucinations or other psychotic symptoms, and approximately five times as likely as those with no mental disorder. There have been further confirmations in Israel (Link, Stueve & Phelan, 1998), Norway (Bjorkly & Havik, 2003) and Austria (Stompe, Ortwein-Swoboda & Schanda, 2004). In a prospective study of 128 men with schizophrenia or schizoaffective disorder, from three European countries and

Canada, Hodgins and colleagues (2003) found that the presence of severe psychotic symptoms, particularly TCO symptoms, was a significant predictor of future violence even after controlling for the presence of antisocial personality disorder.

Findings on associations between TCO symptoms and aggression have not always been consistent and methodological variations may help explain the contradictory results. For example, studies with contradictory findings have measured symptoms differently (Appelbaum et al. 2000), used very different definitions of TCO symptoms (Dean et al., 2007; Milton et al., 2001) and used high risk diagnostically heterogeneous samples that could have prevented adequate assessment of the association between TCO symptoms and violence (Skeem et al. 2006). Despite these variations in findings, the balance of current evidence suggests that in some individuals with schizophrenia the presence of TCO symptoms may constitute a relatively direct risk factor for violence.

2.2.2 Childhood conduct problems potentially increasing the risk for psychosis

The second possible route to psychosis and co-occurring aggression has focused on childhood conduct problems and early adversities. Recent studies have begun to characterise a sub-population of individuals with psychosis where the course of illness is shaped by a complex developmental trajectory that involves childhood conduct problems, substance abuse and violent behaviour.

To date, most findings on the childhood characteristics of individuals with psychosis and violence have been collected retrospectively. In a UK cohort of adults with schizophrenia (n=205), (Hodgins et al. 2008) found a diagnosis of Conduct Disorder

(CD) before the age of 15 to be associated with an increase in the number of conviction for violent crimes. Further, each CD symptom was associated with an increase in the number of violent and non-violent crimes after controlling for sex, age and substance misuse. Swanson et al. (2008) used data on 1,445 participants from the CATIE project and found adult schizophrenia patients with a history of childhood conduct problems were significantly more likely to engage in violent behaviour in the past six months compared to those without childhood conduct problems, and that violence risk increased as a function of the number of childhood conduct problems reported, even when controlling for current substance use.

In a Danish study, Munkner et al. 2003a, linked psychiatric and crime registers to examine individuals with schizophrenia born on or after January 11, 1963 (N=4,691); they found 17% had at least one violent conviction, with 58% of men and 20% of women having sustained their first such conviction before any psychiatric contact. Using the same sample, Munkner et al. 2003b, also reported that individuals with criminal convictions were older at first contact with services than their non-offending peers, suggesting that antisocial behaviour may have distanced them from services.

Although prospective findings are inevitably more limited, some prospective evidence is now available. A recent study in Denmark, for example, (Gosden et al. 2005) examined a cohort composed of all the offenders aged 15–19 years in 1992. Of the 780 persons who were still alive in Denmark in 2001, 3.3% had developed schizophrenia as compared to the expected 0.7%. The odds of developing schizophrenia among those with a history of violent criminal offending (as compared to those with only non-violent offending) was 4.59 (95% CI 1.54–13.74). In an intensively-studied prospective birth cohort, Arseneault et al. (2000) found that a

history of conduct problems, along with excessive threat perception and recent substance use, predicted risk of violence in individuals with schizophrenia spectrum disorder. In addition, findings from the same cohort provide some of the best evidence that CD is a precursor to schizophrenia per se, showing that 40% individuals who developed schizophreniform disorders by age 26 had displayed CD prior to age 15 (n=35) (Kim-Cohen 2003).

2.3 Models of comorbidity: comorbid disorders may share the same risk factors and/or possible overlaps in risk factors

Caron and Rutter's (1991) second and third models reflect processes whereby two disorders share the same (or overlapping) risks. To evaluate the extent to which processes of this kind may be relevant to associations between psychosis and aggression/violence, the following sections outline risk factors for each condition separately, beginning with psychosis.

2.3.1 Risk factors for and correlates of psychosis

A range of specific environmental exposures (both biological and psychosocial) as well as genetic risk factors have been examined at different stages of early life with respect to the aetiology of psychosis. These risk factors are thought to be salient for both early onset psychoses and adult onset cases. In the next section key *individual factors* - pregnancy complications, developmental deficits, theory of mind impairment and poor emotional processing; *familial factors* - expressed emotion (EE) and

childhood maltreatment; and *social factors* - urbanicity, migration, ethnicity and cannabis use will be outlined.

Individual Factors

Individual factors such as pregnancy complications, theory of mind (ToM) impairment and poor emotional processing have all been identified as risk factors for psychosis. Pregnancy and birth complications have long been implicated as risk factors for schizophrenia, with studies reporting an almost doubling of risk in offspring (Cannon et al., 2002b; Byrne et al., 2007). In addition, Cannon et al. (2002) reported psychotic symptoms were associated with early developmental deficits of motor development, language, and IQ in a longitudinal general population sample. Focusing on ToM (the ability to imagine or make deductions about the mental states of other individuals) and emotional processing, there is now substantial evidence for ToM or mentalising impairment in individuals with schizophrenia (Brune, 2005; Harrington et al., 2005; Frith 2004). Two recent meta-analyses (Sprong et al., 2007 and Bora et al. 2009) showed that nearly all published empirical studies reporting ToM impairment in patients with schizophrenia reported large overall effect sizes, (in the order of 1.25) and the magnitude of the impairment reduced but remained significant in remitted patients (0.69). Individuals with schizophrenia have also been shown to display deficits in the recognition of emotions in the faces of others (Schneider et al. 2006) that are present in the prodromal phase and at illness onset (Addington et al. 2008). Arguably, facial emotion recognition will require a non-impaired theory of mind.

Later in development considerable attention has focused on the possible role of cannabis use in risk for schizophrenia. A meta-analysis of four longitudinal

population- based studies from Sweden (Swedish conscript cohort), the Netherlands (NEMESIS) and New Zealand (Dunedin and Christchurch cohorts) concluded that at an individual level cannabis was associated with an overall two-fold increased risk for later schizophrenia (Arsenault et al. 2004). The Dunedin cohort showed that the association was strongest for the youngest cannabis users with 10.3% of the cannabis users at age 15 developing schizophreniform disorder at age 26. Although direct links have not been found between cannabis use and psychosis in child and adolescent samples (possibly due to the low prevalence of cannabis use in younger adolescents and a short duration between exposure and psychotic outcome (Hollis, 2008), studies have reported cannabis use to be associated with an earlier age of onset of schizophrenia in adults (Arendt et al. 2005). The causal direction of the relationship remains unclear as it is possible the development impairments that precede schizophrenia may also be risk factors for cannabis use. Another potential explanation could be that cannabis exposure causes schizophrenia in only those susceptible to the disorder via a gene x environment interaction (Caspi et al. 2005).

Family Factors

Family factors such as expressed emotion (EE) and childhood maltreatment have also been associated with psychosis. High levels of EE (criticism, hostility, and emotional over-involvement) among relatives of adults with schizophrenia have been shown to predict psychotic relapse and poor outcome, highlighting the possibility that high EE could ‘bring forward’ the onset of the disorder in a vulnerable individual; although causal links have not been established (Goldstein, 1987). Comparisons between the parents of adult and childhood onset cases of schizophrenia have not been able to show support for the hypothesis of higher EE in parents of child and

adolescent cases. Asarnow et al. (1994) found children and adolescents with schizophrenia were no more likely to have parents with high EE than non-disordered, whilst Hooley (1987) suggested parents of children and adolescents with schizophrenia tended to express lower levels of hostility and criticism than parents of adult onset patients because they were more likely to perceive their children's behaviour as part of an illness not in their control. Overall the evidence seems to suggest that while EE may be an important maintaining factor, it is not so clear if it is an initial risk factor in adult onset cases and furthermore it may not play an important role in relation to early onset psychosis.

With respect to childhood maltreatment, there has been a growing interest in the role of adverse childhood experiences in the later development of psychotic disorders. Although confidence in earlier studies was somewhat limited due to the discrepancies in findings and several methodological constraints being highlighted (Morgan & Fisher, 2007), recent evidence suggests specific characteristics of childhood adversity appear to be important in relation to clinical psychosis. Rubino et al. (2009), for example, compared three groups (two of adult-onset patients with diagnoses of either schizophrenia or unipolar depression and a control group of volunteers from the general population) on rates of exposure to childhood abuse (physical, sexual, emotional & psychological). Childhood abuse was significantly associated with schizophrenia, with physical and psychological abuse being the strongest statistical predictors of schizophrenia. Furthermore, a large population-based study found severe childhood physical abuse from the main mother figure to have the most robust association with psychotic disorders, particularly when the abuse began prior to 12 years of age (Fisher et al. 2010). Most studies examining this association have focused on adverse experiences in childhood and psychotic

diagnoses/symptoms in adult life. To our knowledge, only one study has examined these associations in younger samples. Arseneault et al. (2011), using one of the samples to be reported on in this thesis, were the first to confirm associations between maltreatment and psychotic symptoms in young people of only 12 years of age.

Social Factors

Recent findings from population studies have suggested that individuals with an urban birth or urban upbringing, as well as those who have experienced migration and minority groups were at an increased risk of developing psychosis (Cantor-Graae & Selten, 2005; Kirkbride et al., 2006; Kirkbride et al., 2008; Fearon et al., 2006). The link between migration and schizophrenia has been reported to be more robust among individuals migrating from a country where the population is predominantly black to a country where the population is predominantly white. In addition, migrating to areas with a lower concentration of people with a similar ethnic background has been found to be associated with a higher liability for psychotic illness (Kirkbride et al., 2007; Veling et al., 2008). Migrants living in deprived areas can be exposed to a range of psychosocial adversities including increased exposure to drugs, violence and crime. Psychosocial adversities associated with being a migrant such as social isolation and discrimination have been cited as the major factors in mediating the link between migration and schizophrenia (Boydell et al. 2001). Broom et al. (2005) hypothesised that the experience of social defeat and isolation increased the liability to dopamine dysregulation and cognitive distortions which in turn could lead to psychosis. A UK population based study reported that although rates of schizophrenia and mania were raised in the African-Caribbean

population, rates for schizophrenia and mania in Asians were not raised to the same extent (Fearon et al. 2006). Possible reasons for these differences in ethnicity are not yet fully understood. Brugha and colleagues (2004), in their survey of householders in Britain found that African-Caribbeans and Black Africans were more likely than other ethnic minority groups to suffer from indicators of social disadvantage, such as: unemployment; lone parent status; lower social class; low perceived social support; poverty (indicated by lack of car ownership) and having a primary social support group of fewer than three close others. Further, they found that adjusting for these factors modestly attenuated the risk of psychosis in these groups and suggested that the excess of psychosis in African-Caribbeans and Black Africans in the UK might partly be explained by socio-economic disadvantage.

The genetic basis for schizophrenia

Extensive evidence makes clear that genetic vulnerability has a part in the aetiology of schizophrenia (Cannon & Jones 1996). Compared to the general population, there are higher rates of schizophrenia among relatives of patients. The genetic risk increases with each affected relative, reaching almost 50% when both parents are affected (McGuffin et al. 1995) and 60-85% when a monozygotic twin is affected (Cardno et al. 1999). Although a genetic basis for schizophrenia has been clearly established, mechanisms of inheritance remain uncertain due to a number of factors; firstly, currently no 'major' gene locus that could explain a substantial portion of the heritability has been identified and a large number of candidate susceptibility genes might contribute to the liability for the illness; secondly, no gene appears to be either sufficient or necessary for the development of schizophrenia; and finally, inconsistent

replications prevent the consideration of any single allelic variant as a gene for schizophrenia (Tandon et al., 2008)

2.3.2 Risk factors for and correlates of conduct problems

Although a number of theories of subtypes for conduct problems have been put forward, evidence for specific risk factors for each type are at this time limited. As a consequence primary risk factors in general that are present in early childhood before the onset of conduct problems will be focused on here. The following risk factors will be outlined in the next section, *individual factors* - perinatal complications, verbal deficits, impulsiveness, executive dysfunction, social information processing and theory of mind impairment; *familial factors* - parenting, exposure to parental conflict, disrupted families, antisocial parents childhood maltreatment; and *social factors* – socio-economic status / poverty and peer influences.

Individual Factors

Perinatal complications, verbal deficits, impulsiveness, executive dysfunction, social information processing and theory of mind deficits are all thought to play important roles in the development of conduct problems. Specifically, although the evidence is mixed Brennan et al. (2003) reported associations between conduct problems and perinatal complications, minor physical anomalies and low birth weight in a large scale general population study. Although it has been reported that smoking in pregnancy may be a predictor of offspring conduct problems (Brennan, et al. 2003) a causal link has not been established and most studies concur that prenatal smoking

may confer vulnerability to other co-occurring risks such as hostile or inconsistent parenting (Fergusson, 1999; Maughan, 2009)

Several longitudinal studies have shown that persistence in antisocial behaviour over periods of years was predicted by low verbal IQ in childhood (Farrington & Hawkins, 1991; Lahey, et al. 1995; Lynam & Henry, 2001). In one prospective longitudinal study, twice as many of the boys scoring 90 or less on a nonverbal IQ test at ages eight to ten years were convicted as juveniles, compared with those scoring above 90 (West & Farrington, 1973). In addition, studies have consistently reported children and adolescents with conduct problems to have poor tested executive functions than non-conduct problem controls (Ishikawa & Raine, 2003; Lynam & Henry, 2001; Nigg & Huang-Pollack, 2003). Specific skills affected appear to involve problem solving, abstract reasoning, self-monitoring, relating previous actions to future goals, sustained attention and concentration and inhibiting inappropriate responses. These mental functions are partly associated with the frontal lobes (Pennington & Ozonoff, 1996), and deficits in them have been linked with disruptive behaviours from preschool samples onwards (Hughes, Dunn & White, 1998; Speltz, DeKlyen, Calderon et al., 1999).

Lipsey & Derzon (1998) found that impulsiveness was the most crucial personality dimension that predicted antisocial behaviour. The most extensive research on different measures of impulsiveness was carried out in a longitudinal community sample of inner city boys – namely the Pittsburgh Youth Study (White et al. 1994). The measures that were most strongly related to self-reported delinquency at ages 10 and 13 years were teacher-reported impulsiveness (i.e. acts without thinking), self-reported impulsiveness, self-reported under-control (i.e. unable to delay

gratification), motor restlessness (from videotaped observations), and psychomotor impulsiveness (on the Trail-Making Test). Overall, cognitive impulsiveness was more relevant than behavioural impulsiveness as verbal behaviour rating tests produced stronger relations with offending than psychomotor performance tests.

Dodge (1993) proposed a social-information processing model of risk for conduct problems which hypothesised that children prone to aggression focused on threatening aspects of others' actions, interpreted hostile intent in the neutral actions of others and were more likely to select aggressive solutions to social challenges as a result of repeated exposure to physical maltreatment. To test this hypothesis, Dodge et al. (1995) carried out a prospective study and found documented physical abuse in kindergarten was strongly associated with conduct problems in primary school; 28% of the abused group developed conduct problems compared to 6% of the non-abused group. The link between physical aggression and conduct problems was mediated by encoding errors and accessing aggressive responses (but not by hostile attributions and positive evaluations of aggressive responses), providing some support for the social cognition model.

Theory of Mind (ToM) or mentalising has been proposed as an important construct in the understanding of violence and delinquent behaviour in general, with the ability being considered important for affect regulatory processes and impulse control as well as the ability to empathise and feel guilt (Allen, Fonagy, & Bateman, 2008; Weiss et al., 2006; Blair, 2005). Recent research has suggested that the relationship between ToM skills and conduct problems is specific to aggressive behaviour, and may also vary depending on the underlying function of the aggressive behaviour. For example, Renouf et al. (2010) reported differential links between ToM and reactive

aggression (i.e. a retaliatory response to a real or perceived threat or provocation) and proactive aggression (i.e. a non-provoked behaviour motivated by the desire for personal gains or the domination of others) with only the former being associated with poor ToM, especially in children who were frequently victimised by their peers. This finding is consistent with previous studies that have highlighted that children who lack the skills to consider another person's perspective for decoding social cues must rely on their own perception of reality, which in turn will be based on previous experiences (Runions & Keating 2007). However, if previous experiences with others are predominantly negative (indeed prior research has shown that harsh treatment by parents may foster reactive behaviour in children with low theory of mind skills (Hughes & Ensor 2006, 2007)), these children may be especially prone to interpret situations as threatening and react aggressively.

Family Factors

Family factors such as parenting, exposure to parental conflict, disrupted families, antisocial parents and childhood maltreatment are all well-established risk factors for conduct problems (Moffitt & Scott, 2008). A meta-analysis concluded that parental reinforcement, parental reasoning, parental punishments, and parental responsiveness to the child were all related to child antisocial behaviour (Rothbaum & Weisz, 1994). In one prospective longitudinal study of South London boys - The Cambridge Study (West & Farrington, 1973) researchers found that harsh or erratic parental discipline, cruel, passive, or neglecting parental attitudes, and poor parental supervision, all measured at age eight years, predicted later juvenile convictions and self-reported delinquency. In general, the presence of any of these adverse family background features doubled the risk of a later juvenile conviction.

Parental conflict and inter-parental violence have repeatedly been found to predict adolescent antisocial behaviour (Buehler et al. 1997). In the Christchurch Health and Development Study in New Zealand, children who witnessed violence between their parents were more likely to commit both violent and property offences according to their self-reports (Fergusson & Horwood, 1998). In addition, witnessing father-initiated violence was still predictive after controlling for other risk factors such as parental criminality, parental substance abuse, parental physical punishment, maternal age, and low family income. Many studies have shown that broken homes or disrupted families predict delinquency (Wells & Rankin, 1991). Longitudinal studies have shown that marital disruption (divorce or separation) in a boy's first five years predicted his later convictions up to age 32 years (Kolvin et al., 1998) and children who were exposed to parental discord and many changes of primary caretaker tended to become antisocial and delinquent (Henry et al, 1993). Several studies using prospective longitudinal data have reported parental antisocial personality disorder to be the best predictor of childhood CD (Cohen et al, 1990; Frick et al, 1992) and parental substance use to be an important predictor of the onset of CD (Loeber et al., 1993; Loeber et al., 1995). Having a convicted mother, father, brother, or sister significantly predicted a boy's own convictions. These findings have consistently been reported across studies (Farrington et al., 2001; Odgers et al., 2007; Szatmari, Boyle & Offord, 1993).

Associations between physical abuse and conduct problems are well established (Hill, 2002). Widom (1997) found significant intergenerational transmission of aggressive and violent behaviour from parents to children in a longitudinal survey of abused children. In the Christchurch study child sexual abuse predicted conduct problems independent of other childhood adversities (Ferguson, Horwood & Lynskey,

1996). In a large prospective study of court-substantiated cases of abuse and neglect, 26% of abused and neglected adolescents were antisocial compared with 17% in a well-matched comparison group, suggesting a modest effect of abuse and neglect (Widom, 1989). However, the rates of antisocial personality disorder among males in adult life within the maltreated group were considerably elevated (20.3% versus 10.1% in the comparison group), which may indicate a more pervasive effect of child maltreatment (Widom, 1997).

Social Factors

Social factors such as socio-economic status / poverty and peer influences have also been associated with conduct problems. The relationship between low socio-economic status (SES) and delinquency varies according to whether SES is measured by income and housing or by occupational standing. Several markers of SES were measured in The Cambridge Study, both for the child's family of origin and for the child as an adult. These markers included occupational standing, family income, housing, and employment instability. Whereas most of the measures of occupational standing were not significantly related to offending, low family income and poor housing predicted official and self-reported juvenile and adult offending (Farrington, 1992). Researchers have suggested that the link between low SES families and antisocial behaviour may be mediated by family factors such as marital discord and parenting deficits (Maughan, 2001). With respect to peer influences, children with conduct problems tend to associate with children with similar antisocial behaviours have discordant interactions with other children and experience rejection by non-deviant peers; as a consequence they generally have poorer peer relationships than non-disordered children (Vitaro, Tremblay & Bukowski, 2001).

Although in general, research suggests that peer difficulties are consequences of conduct problems (Coie, 2004; Ferguson, Woodward & Horward, 1999) there is also evidence to suggest that peer affiliations can lead to conduct problems. In a prospective longitudinal study, for example, Gordon et al. (2004) reported that there was not only a considerable increase in violence and crime after a boy joined a gang, but also that the frequency of offending decreased to pre-gang levels after a boy left a gang.

The genetics of antisocial/aggressive behaviour

There is now substantial evidence that conduct problems are considerably heritable (Moffitt, 2005a; Rhee & Waldman, 2002). Data from both twin and adoption studies have demonstrated higher heritability for aggressive symptoms - approximately 60% - than for delinquency, where estimates typically range between 30 and 40% (Deater–Deckard et al., 1999; Edelbrock et al., 1995; Eley, Lichtenstein, & Stevenson, 1999). Adoption studies have reported an interaction between antisocial behaviour in the biological parent and adverse conditions in the adoptive home that predicted the adopted child's antisocial outcome (Bohman, 1996; Cadoret et al., 1995). The genetic risk was modified by the rearing environment. A twin study found the experience of maltreatment was associated with an increase of 24% in the probability of diagnosable conduct disorder among children at a high genetic risk but an increase of only 2% among children at a low genetic risk (Jaffee et al., 2005). Further, it has been reported that the association between maltreatment and antisocial behaviour is conditional, depending on the child's monoamine oxidase A (MAOA) genotype; maltreated children with a genotype conferring high levels of MAOA expression were reported to be less likely to develop antisocial problems

which could explain in part why not all victims of maltreatment grow up to victimise others, and provides epidemiological evidence that genotypes can moderate children's sensitivity to environmental insults (Caspi et al. 2002).

2.3.3 Theories of comorbidity revisited

As outlined at the beginning of the current chapter, four possible explanations for higher than expected levels of comorbidity between disorders have been suggested (Caron & Rutter, 1991). First, one disorder may create an increased risk for another. Second, overlapping disorders may share the same risk factor or factors. Third, there may be overlap between risk factors, such that the individual is at risk for two separate conditions with the risk mechanisms for each independent but co-occurring. And finally, the comorbid pattern itself may constitute a meaningful distinctive syndrome.

From the evidence provided so far it appears that processes consistent with at least the first and second of these accounts may be implicated in the increased risk of violence observed in individuals with schizophrenia. In line with the first explanation, it is possible that specific patterns of psychotic symptoms could increase risk for aggression and that conduct problems in childhood could increase risk for psychosis. Similarly, in line with the second explanation, it is clear that psychosis and conduct problems/aggression share a number of risk factors in common, including individual factors (neurological deficits, pregnancy complications), family factors (maltreatment) and social factors (socio-economic status) which - whether alone or in combination - could plausibly contribute to an increased level of violence in individuals with psychosis. Whether these risk factors operate through similar or different

mechanisms (relevant to the third explanation) is difficult to determine from the evidence that is currently available.

Having outlined key risk factors for psychosis and conduct problems considered separately, the next section will examine predictors that have emerged from studies directly exploring risks for co-occurring psychosis and violence in adult samples.

2.3.4 Risk factors for and correlates of psychosis and co-occurring aggression

Demographic, familial, and individual factors

In clinical samples, Walsh et al. (2004) identified a history of assault or conviction for violence, alcohol abuse and having received special education as the best independent predictors of violence in those with schizophrenia. Dean et al. (2007) highlighted younger age, past violent offending and diagnoses of both schizophrenia and mania as associated with aggression at first contact with services. Baxter et al. (1999) followed up a cohort of 63 patients with schizophrenia treated in medium secure units and found the group had high levels of previous inpatient psychiatric care (86%), violent offending (68%), substance abuse (71%), alcohol abuse (29%), history of conduct disorder (48%) and periods in care (22%). Swanson et al. (2002) examined an extensive range of risk factors and correlates of violent behaviour in individuals with psychotic and mood disorders being treated in inpatient and outpatient settings (n=802); they found that violence was independently associated with a history of violent victimisation, homelessness, cohabitation, exposure to community violence, substance abuse, poor self-rated mental health status, and a history of psychiatric hospital admission.

Studies using general population samples have highlighted similar findings. Cannon et al. (2002) identified poor educational attainment and poor grades for attention in school as childhood risk factors for later criminality and violence in a large Finnish register-based cohort of individuals with schizophrenia. Eriksson et al. (2010) found that low marks for conduct in school, prior contact with police or child care authorities, crowded living conditions and arrest for public drinking were associated with serious violent offending in schizophrenia in a large Swedish cohort. Fazel at el. (2009) linked several nationwide population-based registries in Sweden and followed 13,806 patients with two or more hospitalisations for schizophrenia between 1973 and 2004. Socio-demographic factors (low income, low education, being an immigrant and having children); individual factors (comorbid alcohol and drug abuse and previous violent crimes) and familial factors (parental alcohol abuse and parental violent crime) were all associated with violent offending.

Focusing on pregnancy complications and inadequate parenting, Hodgins et al. (2001) used official records from a Swedish cohort of 15,117 individuals born in Sweden and followed up to the age of 30. Inadequate parenting was shown to increase the risk of violent offending in men (2.02 times, 95% CI 1.67-2.44) and in women (2.09 times, 95% CI 1.70-2.56). Pregnancy complications in the absence of inadequate parenting were not associated with an increased risk of violent offending, and the combination of pregnancy complications and inadequate parenting increased the risk of both non-violent and violent offending only slightly more than inadequate parenting alone.

Theory of mind / emotional processing

Weiss et al. (2006) tested emotion recognition abilities in male inpatients with a diagnosis of schizophrenia (n=41). They found a history of arrest was associated with poor recognition of emotions, most particularly fearful faces, after adjusting for age, education, duration of illness and symptom severity. The number of arrests for violent crimes was associated with the misinterpretation of faces as fear or sadness, while aggressive behaviour was associated with misinterpreting faces as angry.

Abu-Akel & Abushua'leh (2003) investigated whether violence among individuals with schizophrenia was linked to mentalising or theory of mind (ToM) and empathic abilities. Male inpatients diagnosed with paranoid schizophrenia (n=24) were divided into violent and nonviolent groups based on their history of committing violent acts. Violence was associated with the combination of hostility towards others, poor empathy and good mentalising abilities. Similarly, Majorek et al. (2009) compared a forensic (n=33) and non-forensic group (n=38) of inpatients with schizophrenia with a healthy control group (n=29), in relation to mentalising abilities, executive functioning, psychopathology and intelligence. As expected both forensic and non-forensic patients with schizophrenia performed more poorly, relative to controls, on measures of verbal intelligence, executive functioning, and ToM. Comparing both patient groups, no differences emerged with regards to the sequencing task (a measure of basic understanding of the social interaction depicted) or with respect to premorbid intelligence or executive functioning. However, differences were found regarding the interaction of ToM performance with psychopathology; the forensic group ToM correlated inversely with ''excitement'' and cognitive symptoms. When ''excitement'' was covaried out, forensic patients outperformed non-forensic patients with regards

to ToM whereas no such interaction was found with respect to the cognitive component. The authors suggested this finding could underscore the assumption that symptoms such as excitement, hostility, tension, and poor impulse control (comprised of the ‘‘excitement component’’ in the five-factor model of the Positive and Negative Symptom Scale (Kay et al. 1989)) may negatively influence mental state comprehension during social interaction.

Interestingly, both of these studies reported *better* mentalising abilities in the violent than the non-violent group. Mentalising abilities are necessary for manipulative and deceptive purposes and it has been suggested that it is possible that violence observed among patients with paranoid schizophrenia can be attributed, in addition to deficits in empathic abilities, to the ability to use mentalising abilities to manipulate and deceive their victims (Abu-Akel & Abushua'leh, 2004). Although there is some support for this with a previous study reporting that patients with schizophrenia can commit premeditated violent crimes (Rice, 1997), given the small sample sizes of these studies and the currently rare research addressing the relation between schizophrenia, violence and mentalisation, further replication of these findings is clearly needed.

Substance misuse

A high prevalence of violence in patients with comorbid substance abuse and schizophrenia has been reported across a range of epidemiological (Lindqvist & Allebeck, 1990a) as well as longitudinal prospective studies (Appelbaum et al., 2000; Fazel, et al., 2009; Monahan et al., 2000; Tengström et al., 2000). It has been demonstrated repeatedly that schizophrenia with comorbid substance abuse

increases the risk of violence considerably compared with schizophrenia without such comorbidity (Swanson et al, 1990; Tiihonen et al, 1997; Wallace et al, 1998; Eronen, Hakola, & Tiihonen, 1996;). For example, Soyka et al. (1994, 1993) reported that patients with schizophrenia and comorbid substance abuse were twice as likely to engage in violent acts and have higher convictions rates (40.1% vs. 13.7%) when compared to patients without substance abuse. A similar finding was recently reported in a longitudinal study by Fazel et al. (2009), where the rates of violent crime among patients with schizophrenia with comorbid substance abuse were 2.5 to 3 times higher than for patients without comorbid substance problems. However, as outlined in the studies presented in the previous chapter, research has suggested that even after controlling for substance abuse, the association of violence with psychosis remains (Swanson et al., 2008; Arsenault et al, 2000, 2003; Brennan et al, 2000), suggesting that substance abuse predominantly functions to increase the level of risk rather than functioning as an independent causal factor.

Comorbid Antisocial Personality Disorder / Psychopathic traits

A number of studies have found a high percentage of individuals with schizophrenia to meet criteria for comorbid antisocial personality disorder (APD) (Tengström et al., 2001; Moran et al., 2003; Taylor et al., 1998, 2008b). Indeed, Hodgins, Toupin, & Côté, (1996) found personality disorder to be 5 to 11 times more prevalent among persons with schizophrenia than among age and gender-matched individuals in the general population. In a systematic review of 20 studies involving 6,345 patients with psychotic disorders, including schizophrenia, Newton-Howes et al. (2008) found that 39.5% (95% CI 25.2–55.8) had comorbid personality disorders.

As well as APD, it has also been proposed that among offenders with schizophrenia, there is a subgroup whose offending is related to previous histories of antisocial behaviour and personality traits and characteristics associated with psychopathy (Tengström et al. 2004; Abushua'leh & Abu-Akel, 2006; Fullam & Dolan, 2008). It has been proposed that a stable pattern of antisocial behaviour that emerges early in life is driven by partially heritable personality traits that are strengthened or weakened during childhood and adolescence by parenting and other environmental factors (Lahey, Waldman, & McBurnett, 1999). In adults, these traits are labeled as *arrogant and deceitful interpersonal conduct* and *defective emotional experience* (Cooke & Michie, 2001) and in children as *callous and unemotional* (Frick, 2012). At all ages, impulsivity and sensation-seeking are common among these individuals (Frick et al., 2012). Prospective investigations that have followed children from infancy have shown that early manifestations of these traits (difficult temperament, hard to manage, impulsive and irritable) can be assessed as early as 3 years of age and that they remain stable into adulthood, as does the antisocial behaviour (Caspi & Silva, 1995; Caspi et al., 1996; Moffitt & Caspi, 2001).

Building on this, Tengström et al. (2004) reviewed the files of patients with schizophrenia who underwent pretrial psychiatric assessment in Sweden between 1988 and 1993, as a result of charges involving violent offending. Of the 202 patients reviewed, 78 met the Psychopathy Check List-Revised (PCL-R) criteria (Hare, 1991) for psychopathy. When looking at the relationship between convictions and level of psychopathy in these patients, the total PCL-R psychopathy scores were highly correlated with the number of convictions per year (r=0.62), and moderately, but significantly correlated with the number of convictions for violent crimes per year (r=0.38). The results also indicated that offenders with schizophrenia with high PCL-

R scores had histories with more severe violent offending, displayed more violent offending and engaged in violence more often compared to low PCL-R scoring patients with schizophrenia.

From the findings outlined above, clear evidence is provided for the presence of shared risks for both violence and psychosis in some individuals, with risk factors for aggression/violence often clearly paralleling those identified in non-patient, population samples. Although Caron & Rutter's (1991) fourth model (of the conjoint pattern constituting a separate disorder or syndrome) has not been directly examined, the pattern of the findings available to date provides little support for a model of this kind.

2.4 Risk factors for and correlates of early onset psychosis and aggression

As outlined earlier, as yet very few studies have examined the overlap between psychosis and aggression in adolescence, and only one study to our knowledge has reported on factors associated with violence in an adolescent sample. Clare and colleagues (2000) reported a retrospective case note study of two groups of 12-18 year-olds admitted to two inpatient units with a diagnosis of psychosis. Fourteen young people with histories of violent behaviour resulting in police cautions or criminal proceedings were compared with 25 cases with no history of criminal violence. The two groups did not differ on psychopathological variables (including delusions, hallucinations and elevated or fluctuating mood), but violence was associated with exposure to physical and emotional abuse, previous psychiatric and offending histories, and higher rates of contact with social services and admissions to public care. Unlike results of studies in adult schizophrenia, the authors found

psychosis to be more closely associated with social factors than with specific symptoms of the psychotic illness and argued that the sum of psychosocial problems may be more important than the type of symptoms for estimating the risk for violent behaviours.

2.5 Conclusion

As outlined in the previous chapter, while evidence clearly supports an association between psychosis and aggression in adulthood, to date, few studies have examined these two conditions (or precursors to them) in child and adolescent samples. Whilst the low prevalence of early onset psychosis presents challenges here, these can be overcome by utilising clinical samples, and by building on studies of child-reported psychotic symptoms, which have been shown to share the same risk factors as adult onset psychosis. As the evidence presented in this chapter attests, the relationship between conduct problems/aggressive behaviour and psychosis is likely to be heterogeneous: antisocial behaviour may precede disorder onset, psychotic symptoms may play a role in the onset of aggressive behaviour, and a range of shared or overlapping risk factors may also contribute to the overlap. By examining the association in children and adolescents it may be possible to identify more specific risks for this conjoint pattern at a much younger age, leading to more effective interventions for at-risk young people and their families.

Aims, research questions, hypotheses and structure of the thesis

Against this background, this thesis examines the relationship between psychosis and aggressive behaviour in child and adolescent samples. The overarching aim of the research is to compare clinical characteristics and associated features in young people with co-occurring psychosis and aggression to those with psychosis or aggression alone. Given the limited evidence available in child and adolescent populations, the research question and hypotheses presented here are based on findings from adult studies. With this in mind the overarching research question is: *are the risk factors and correlates of co-occurring psychosis and aggression in adolescence similar to or different from those for psychosis or aggression only?* This research question is examined in three separate samples (clinically referred, inpatient and non-referred community). The overarching hypothesis is: *those with both psychosis and aggression will share risk factors and correlates with both 'pure' groups.* The overarching research question is the same in all three studies; specific hypotheses in each of the three empirical studies are investigated and are set out in each chapter describing the studies.

The first empirical chapter (chapter 3) reports findings from a cross-sectional study based on secondary analysis of an existing dataset which includes information collected routinely for over 40 years at the Child & Adolescent Department of the Maudsley Hospital. The database provides structured data on symptoms, diagnoses, associated psychosocial circumstances and demographic background. Information on young people referred to outpatient and inpatient settings was used to examine

diagnostically defined psychosis and its association with aggression. A paper based on this work has been published in *Social Psychiatry and Psychiatric Epidemiology* (Khalid, Ford & Maughan, 2012).

The second empirical study (reported in chapters 4 & 5) is a cross-sectional study which involved new data collection within inpatient units. Young people admitted to 5 general adolescent and 5 medium secure units across England were interviewed using standardised, validated measures including a diagnostic tool. Collateral information was obtained through interviews with members of staff and young people's medical notes. The overlap between diagnostically defined psychosis and aggressive behaviour was examined. This research allowed us to build on findings from the previous study to explore additional specific symptoms of psychosis (including delusional threat-control override symptoms), additional aspects of antisocial behaviour (such as callous and unemotional traits), as well as associations with a range of adverse experiences, including victimisation and maltreatment.

The third empirical study (chapter 6) examines psychotic symptoms and aggression using secondary analysis of data from the prospective Environmental Risk (E-Risk) Longitudinal Twin Study, a non-referred national community sample. Self-reports of psychotic symptoms were collected at age 12 and maternal reports of antisocial behaviour were available at ages 5, 7, 10 and 12 years. In addition, a wide range of data, based on multiple measurement modalities, allowed for assessment of associations with demographic factors, developmental impairments, symptoms and diagnoses at ages 12, 10, 7 and 5 years as well as particular psychosocial risks including parental mental health problems, parental antisocial behaviour and maltreatment. This study enabled us to test the extent to which findings from the

clinical studies were replicated in a general population sample, as well as allowing exploration of a wide range of potential predictors collected prospectively at different time-points from multiple sources.

In all three studies young people with psychosis (or psychotic symptoms) only, young people with aggression only and those with both sets of difficulties (co-occurring cases) are contrasted on demographic background factors, familial factors, symptoms, diagnoses and clinical features as well as psychosocial circumstances.

Chapter 7 of this thesis provides an overall discussion of the research findings, their implications for research, policy and practice and suggests possible future directions.

Chapter 3

Aggressive behaviour and psychosis in a clinically referred child and adolescent sample

3.1 Introduction

This chapter reports results from the first of three empirical studies designed to examine the overlap between psychosis and aggression in young people. In particular for this study, clinically referred children and adolescent samples were investigated. As described in the introductory chapters, adult studies using clinical samples have reported younger age, a history of assault or conviction for violence, alcohol abuse and having received special education as the best independent predictors of violence in those with schizophrenia (Dean et al., 2007; Walsh et al.,2004; Swanson et al., 2002) . In addition, Dean and colleagues (2007) noted that individual symptoms commonly associated with a diagnosis of mania (including heightened subjective functioning, expansive mood and overactivity) were also predictive of aggression in patients with a diagnosis of schizophrenia.

3.1.1 Research question

Are the risk factors and correlates of co-occurring psychosis and aggression similar to or different from those for psychosis or aggression only?

3.1.2 Research hypothesis

Rates of behavioural problems, substance abuse and exposure to adverse experiences in the co-occurring group would be higher than in psychosis-only cases, and similar to those of aggressive-only cases.

3.1.3 Research aims and objectives

The aims of this study were (i) to compare young people with psychosis only with those with psychosis and co-occurring aggression; and (ii) in light of suggestions from previous studies (Eriksson et al., 2010) that predictors of violence/offending in schizophrenia are similar to those in non-disordered samples, an additional comparison group of young people with evidence of aggression, but not of psychosis (aggression-only) were also included. The adult literature in this area has focused predominantly on schizophrenia; the broader category of psychosis was chosen because diagnostic instability is known to be marked in childhood and adolescence (McClellan et al., 2002).

As previously outlined, research focusing on adolescents who suffer from a dual pattern of co-occurring aggression and diagnostically defined psychosis is rare. These issues are explored further here using data on a large sample of children and adolescents referred as inpatients and out-patients to a local and tertiary referral centre between 1973 and 2004. This database provides systematic data on a wide range of symptoms and associated psychosocial circumstances and has been informative in previous studies of psychosis (Hollis, 1995; Hollis, 2000) that found high levels of diagnostic stability in a follow-up to adult life.

3.2 Method

Since 1973, the children's directorate of the South London and Maudsley NHS Foundation Trust has used a system of clinician-completed 'item-sheets' for gathering clinical data on out-patient and inpatient referrals at initial assessment. The child's initial assessment comprises of parental interview, a mental state examination with the child and often full psychometric assessment by a clinical psychologist. This is followed by a multidisciplinary team case discussion before feeding back to the family and planning an intervention. The item sheet – providing structured data on demographic background, symptoms, diagnoses, and associated psychosocial circumstances is completed by a clinician within 2 weeks of this assessment and held on a computerised database. A copy of the item sheet can be found in appendix 3.1.

The reliability of the item sheet ratings as recorded by trainee psychiatrists (who completed the majority of ratings) has been found to be generally high when compared with those of a consultant child psychiatrist, with inter-rater correlations varying from 0.64 to 0.95 (Goodman & Simonoff, 1991). The Maudsley item sheets have been used as part of studies focusing on a variety of diagnoses including early-onset psychosis (Hollis, 1995; Hollis, 2000 Garralda, 1984; Cannon et al., 2001).

3.2.1 Measures

The item sheets code data on: *Child and family demographics***:** sex; age; ethnicity; social class; special educational needs; current parental situation.

*Illness history and other antisocial symptoms***:** duration of disorder; past treatment; aggressive and non-aggressive conduct problems; contacts with police/juvenile courts; substance abuse.

*Other symptoms and difficulties***:** *emotional symptoms:* morbid anxiety; morbid depression; guilt; suicidal ideas or attempts; self injury; morbid irritability; intrusive thoughts; abnormally elevated mood, depersonalisation/derealisation; *attention and activity symptoms:* clumsiness or poor coordination; restlessness or fidgetiness; gross overactivity, impaired concentration; markedly impulsive behaviour; *speech and language symptoms:* impaired use of language for social communication; *somatic symptoms:* disturbance of sleeping; *social interaction impairments:* autistic type disturbance of social interaction/relationships; social disinhibition.

Family psychiatric history, family relationships and psychosocial adversity: mental disorder/treatment in family members; poor family relationships; parenting (including hostility to the child and inadequate supervision); exposure to a range of psychosocial adversities including abuse (physical or sexual); exposure to frightening experiences; persecution and migration.

All symptoms and psychosocial variables were coded 0 (not present), 1 (minimally present), and 2 (definitely present). Variables rated as ‘definite’ were contrasted with those coded 0 or 1 throughout the analyses.

3.2.2 Samples

Participants were children and adolescents assessed by the Children's Department of the Maudsley Hospital in South London between 1973 and 2004. Children younger than 7 years and young people older than 18 years were excluded from the original sample (n=10,355), as were those with IQ<70. Three groups were constituted from the remaining cases (n=6770):

Psychosis-only (n=173): young people who met criteria for an ICD-10 diagnosis of schizophrenia (F20.0–F20.9), schizotypal disorder (F21), persistent delusional disorder (F22.0–F22.9), acute and transient psychotic disorders (F23.0-F23.9),schizoaffective disorder (F25.0-F25.9), other and unspecified non-organic psychotic disorders (F28, F29), or psychotic types of mood affective disorders (F30.2, F31.2, F31.5, F32.3, F33.3) (equivalent ICD-9 codes for 1978-1991 and ICD-8 codes were used for cases referred in 1973-1977).

Aggressive-only (n=1346): young people rated 'definite' on the physically aggressive symptoms of *1)* fighting, bullying, aggression, or *2)* violent assault (stabbing or use of other weapon, severe physical attack).

Co-occurring cases (n=39): young people who met criteria for both psychosis and aggression.

Individual symptom ratings were scored in a consistent way through the study period (Goodman & Simonoff, 1991), but the psychosocial section of the item sheets was revised in 1992, when additional variables were included. Unless otherwise specified,

Ns in the text and tables refer to the full 1973-2004 sample. Analyses of post-1992 variables were based on reduced samples (psychosis-only: n=58; aggressive-only: n=562: co-occurring, n=19).

Ethical approval for the current study was granted by the Research Ethics Committee of the Institute of Psychiatry and South London and Maudsley NHS Trust.

3.2.3 Statistical Analysis

All analyses were carried out using STATA version 10 (StataCorp 2007). Odds ratios and 95% confidence intervals were calculated from multinomial logistic regression models, and are reported for three comparisons: co-occurring *versus* aggressive-only; co-occurring *versus* psychosis-only; and aggressive-only *versus* psychosis-only.

Power

Power calculations were undertaken in STATA version 10 (StataCorp 2007) to assess the power of the design to detect differences between (1) aggressive-only *versus* co-occurring; (2) psychosis-only *versus* co-occurring; and (3) aggressive-only *versus* psychosis-only on categorical measures of demographic, clinical and psychosocial factors. Given the sample size in each of the groups, Table 3.1 shows the rates of risk factor exposure needed in the co-occurring group to detect significant differences from each 'pure' group with 80% power at an alpha level of 0.05, at selected levels of risk in each group (5%, 10%, 20%, 30%). Power calculations for the full sample (1973-2004) suggest the there is adequate power to detect group differences that are likely to be of clinical and/or theoretical significance;

figures for the post 1992 period suggest although it is possible to detect differences, findings should be treated with caution due to the modest sample sizes.

Table 3.1 Power calculations for the full 1973-2004 sample

Aggressive only vs. Co-occurring		**Psychosis only vs. Co-occurring**		**Aggressive only vs. Psychosis only**	
Aggressive only (n=1346)	Co-occurring (n=39)	Psychosis only (n=173)	Co-occurring (n=39)	Aggressive only (n=1346)	Psychosis only (n=173)
Assumed risk exposure	*Minimum risk exposure to detect difference*	*Assumed risk exposure*	*Minimum risk exposure to detect difference*	*Assumed risk exposure*	*Minimum risk exposure to detect difference*
5%	26%	5%	24%	5%	6%
10%	27%	10%	30%	10%	18%
20%	41%	20%	44%	20%	30%
30%	53%	30%	56%	30%	41%

Table 3.2 Power calculations for the reduced post 1992 sample

Aggressive only vs. Co-occurring		**Psychosis only vs. Co-occurring**		**Aggressive only vs. Psychosis only**	
Aggressive only (n=562)	Co-occurring (n=19)	Psychosis only (n=58)	Co-occurring (n=19)	Aggressive only (n=562)	Psychosis only (n=58)
Assumed risk exposure	*Minimum risk exposure to detect difference*	*Assumed risk exposure*	*Minimum risk exposure to detect difference*	*Assumed risk exposure*	*Minimum risk exposure to detect difference*
5%	17%	5%	88%	5%	30%
10%	36%	10%	44%	10%	24%
20%	51%	20%	58%	20%	38%
30%	63%	30%	69%	30%	49%

3.3 Results

3.3.1 Sample characteristics

As outlined earlier, 173 young people met study criteria for 'pure' psychosis, 1346 were classified as physically aggressive only, and 39 showed both patterns of difficulty. As these figures suggest, physical aggression was reported in approaching a fifth of all cases with diagnoses of psychosis (39/212, 18.4%); by contrast, only 2.9% of cases with marked aggressive symptomatology had evidence of psychosis (39/1385). Within the complete psychosis sample, rates of aggression were very similar in young people with affective psychosis (16.7% - 11/66) as compared to those with non-affective psychosis (19.2% - 28/146 χ^2 (1) = 0.19, p=0.662).

3.3.2 Bivariate analyses of risk factors and correlates of the co-occurring group compared to the psychosis-only and aggression-only groups

Demographic background

Child and family demographic characteristics are shown in Table 3.3. As expected, the aggressive-only group were predominantly male, and were younger than members of the psychosis-only sample at the time of the index referral. Gender and age were thus included as covariates throughout the remainder of the analyses. Psychosis-only cases were more likely than young people in the aggressive-only

group to have a parent from a non-white background, but were less likely to be from lower socio-economic backgrounds, or to be living in care homes or institutions at the time of referral. Although not statistically significantly different, psychosis-only cases were also somewhat less likely to have special educational needs compared to the aggressive-only group.

Co-occurring cases resembled the psychosis-only group on a number of these indicators (gender ratios, age at referral and ethnicity) and differed from the aggressive-only cases by being significantly older and more likely to have a parent from a non-white background. In terms of family social class, special educational needs and living in care homes or other institutions, young people with co-occurring psychosis and aggression had profiles comparable to those in the aggressive-only group.

Because gender ratios differed between the co-occurring and aggressive groups, a series of additional analyses were carried out testing whether the patterns of group differences identified on demographic factors differed for boys and girls. None of these tests for interactions with gender was significant.

Table 3.3: Child & family demographics

	Aggressive only (N=1346) (%)	**Co-occurring (N=39)** (%)	**Psychosis only (N=173)** (%)	Group Contrasts					
				Co-occurring vs. Aggressive		Co-occurring vs. Psychosis		Aggressive vs. Psychosis	
				OR	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Sex - Male	75.2	48.7	52.6	0.31**	0.16 - 0.59	0.86	0.43 - 1.72	2.81**	2.09 - 3.78
Age - Mean (years)	12.0 (SD 2.77)	14.6 (SD 2.09)	14.6 (SD 2.29)	1.54**	1.31 - 1.81	0.99	0.84 - 1.18	0.65**	0.59 - 0.70
Ethnicity									
Parent									
Mother non-white	15.3	41.7	33.1	3.16**	1.57 - 6.34	1.44	0.69 - 3.03	0.41**	0.29 - 0.59
Father non-white	19.5	48.4	34.4	3.18**	1.52 - 6.63	1.84	0.84 - 4.03	0.51**	0.36 - 0.73
Child									
Child white‡	90.6	75.7	80.5	-	-	-	-	-	-
Child non-white	3.6	18.9	13.4	5.07**	2.06 - 12.4	1.51	0.59 - 3.89	0.29**	0.17 - 0.53
Child mixed	5.8	5.4	6.1	0.97	0.22 - 4.28	0.95	0.19 - 4.57	0.97	0.47 - 2.00
--									
Low Social Class	68.1	66.7	46.2	0.95	0.43 - 2.10	*2.39	1.03 - 5.60	2.08**	1.42 - 3.04
Current Parental status									
Both parents living together‡	40.7	39.5	54.8	-	-	-	-	-	-
Single parent	24.8	21.1	26.2	0.89	0.37 - 2.14	1.11	0.44 - 2.82	1.25	0.83 - 1.90
Step parent/relatives	15.7	13.2	12.0	0.98	0.35 - 2.78	1.52	0.49 - 4.66	1.54	0.89 - 2.65
Foster parents	5.2	2.6	1.2	0.52	0.66 - 4.09	3.11	0.27 - 36.6	5.98*	1.39 - 25.8
Care home/other institution	13.6	23.7	5.9	0.99	0.42 - 2.39	5.73**	1.97 - 16.7	5.74**	2.83 - 11.6
Special Educational Needs^	47.3	42.1	26.3	1.49	0.55 - 4.04	2.55	0.77 - 8.43	1.27	0.72 - 2.22

^post 1992 data only ‡taken as reference * p< 0.05 **p< 0.001 -- Adjusted for age and gender this point onward

Clinical characteristics

Table 3.4 presents data on illness history, along with rates of non-aggressive antisocial behaviours and substance abuse in the three study groups. In contrast to the psychosis-only group (where over half the young people had problems of relatively recent onset), the aggressive-only cases had more longstanding difficulties. It is important to note that duration of disorder here refers to duration of *any* illness, and not necessarily to duration of psychosis. By definition, the aggressive-only group showed evidence of aggressive antisocial behaviours and not unexpectedly they also had high rates of non-aggressive conduct problems and were more likely to have contact with the police compared to the psychosis-only group.

Similar to the aggressive-only cases, the co-occurring group also had more long-standing difficulties. In terms of non-aggressive conduct problems, the co-occurring group had somewhat lower levels than the aggressive-only cases but still markedly higher than those in the psychosis-only group; they were also more likely to have had contacts with the police. Although the majority of young people in all three study groups had received previous psychological or psychiatric treatment the rates of past treatment contacts were especially high in the co-occurring group. Rates of substance abuse showed no significant differences between the co-occurring and either pure group. Formal tests for gender interactions again found no significant gender x group differences on any of these indicators.

Table 3.4: Clinical characteristics I: illness history and other antisocial behaviours

	Aggressive only (N=1346) (%)	**Co-occurring (N=39)** (%)	**Psychosis only (N=173)** (%)	Group Contrasts					
				Co-occurring vs. Aggressive		Co-occurring vs. Psychosis		Aggressive vs. Psychosis	
				OR	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Duration of Disorder									
< 12 months‡	16.2	38.9	58.0	-	-	-	-	-	-
≥ 1 year ≤ 3 years	23.9	36.1	25.4	0.62	0.28 - 1.37	2.13	0.92 - 4.91	3.44**	2.22 - 5.32
> 3 years	60.0	25.0	16.6	0.19**	0.08 - 0.46	2.27	0.89 - 5.79	11.8**	7.33 - 19.0
Past Treatment									
Previously seen psychiatrist /psychologist/ social worker	64.7	89.2	70.7	4.39*	1.53 - 12.1	3.50*	1.17 - 10.5	0.69*	0.49 - 0.99
Non-aggressive antisocial behaviour									
Defiance	71.9	44.7	7.5	0.37*	0.19 - 0.74	10.6**	4.41 - 25.4	13.0**	8.56 - 19.8
Stealing	38.8	10.8	7.0	0.16**	0.06 - 0.47	1.62	0.49 - 5.37	8.93**	5.22 - 15.3
Destructiveness / malicious damage	41.1	27.0	6.4	0.55	0.26 - 1.16	5.58**	2.14 - 14.5	5.95**	3.68 - 9.64
Truancy / staying out late	30.5	18.4	5.8	0.28**	0.12 - 0.65	3.72*	1.31 - 10.6	9.04**	5.29 - 15.4
Running / wandering away from home	23.6	15.8	8.1	0.41	0.16 - 1.01	2.14	0.76 - 6.01	4.20**	2.53 - 6.96
Sexual misbehaviour	9.6	18.4	2.3	1.55	0.65 - 3.66	9.66**	2.66 - 35.1	2.61*	1.35 - 5.04
Cruelty to animals	6.4	7.7	0	1.48	0.32 - 6.75	-	-	3.52	0.81 - 15.3
Fire setting	10.2	7.7	3.0	0.80	0.18 - 3.55	2.69	0.46 - 15.6	2.46*	1.01 - 5.99
Brought before Juvenile Court									
No‡	76.7	81.6	91.1	-	-	-	-	-	-
No, but police caution	6.8	7.9	1.8	0.61	0.18 - 2.11	5.23*	1.00 -27.3	8.52**	2.59 - 27.9
Yes	16.5	10.5	7.1	0.26*	0.09 - 0.78	1.81	0.53 -6.11	6.97**	3.68 - 13.2
Substance abuse	8.0	10.5	8.2	0.55	0.18 - 1.62	1.36	0.40 - 4.54	2.38*	1.36 - 4.16

^post 1992 data only ‡taken as reference * p< 0.05 **p< 0.001

Table 3.5 illustrates other co-existing symptoms and difficulties. Compared to aggressive-only cases, young people in the psychosis-only group were more to likely to show a range of emotional symptoms (anxiety, depression, elevated mood and depersonalisation/derealisation). The two pure groups also differed on most symptoms of attention and activity, speech and language impairments, sleep disturbances and relationship difficulties, as well as social inhibition and autistic-type disturbances of social interactions/relationships.

The profile of co-occurring cases was similar to that of the psychosis-only group (and differed from the aggressive-only cases) on the majority of emotional symptoms. Levels of morbid irritability significantly exceeded those in the psychosis-only group and although not significant, rates of self-harm were elevated in relation to young people with psychosis only. In terms of attention and activity symptoms, co-occurring cases had elevated rates of restlessness/fidgetiness compared to both pure groups. They resembled psychosis-only cases in levels of gross overactivity, clumsiness/poor coordination and impaired concentration, and also in terms of language impairments and sleep disturbances.

In addition to symptoms, three types of relationship difficulties were also coded in the item sheets: ‘overt’ relationship disturbances, autistic-like difficulties and social disinhibition. In most domains of overt disturbances both aggressive-only and co-occurring cases had significantly higher rates of problems than young people in the psychosis-only group. Small proportions with co-occurring difficulties also, however, showed autistic-type disturbances of social interaction more typical of psychosis-only cases, and co-occurring cases were noticeably more likely than either pure group to

be rated as socially disinhibited. Once again, tests for interactions with gender confirmed that these patterns of group differences were similar for boys and girls.

Table 3.5: Clinical characteristics II: other comorbid symptoms and difficulties

	Aggressive only (N=1346) (%)	**Co-occurring (N=39)** (%)	**Psychosis only (N=173)** (%)	Group Contrasts					
				Co-occurring vs. Aggressive		Co-occurring vs. Psychosis		Aggressive vs. Psychosis	
				OR	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Emotional									
Morbid anxiety	13.5	28.2	39.5	2.44*	1.17 - 5.12	0.60	0.28 - 1.29	0.29**	0.20 - 0.41
Morbid depression	21.6	43.6	42.2	2.28*	1.17 - 4.45	1.05	0.52 - 2.14	0.46**	0.33 - 0.64
Intrusive thoughts^	6.7	52.9	18.2	9.15**	3.13 - 26.8	6.33*	1.75 - 22.9	0.33**	0.17 - 0.65
Guilt^	14.1	33.3	20.7	1.85	0.63 - 5.44	1.76	0.53 - 5.89	0.80	0.42 - 1.52
Suicidal ideas/threat/attempt	13.9	18.4	24.0	0.65	0.26 - 1.58	0.29	0.41 - 1.76	0.97	0.65 - 1.44
Self injury^	14.3	29.4	8.6	1.38	0.45 - 4.29	4.16	0.95 - 18.3	1.65	0.77 - 3.52
Morbid irritability	42.8	53.8	22.5	1.51	0.78 - 2.93	4.01**	1.93 - 8.31	1.93**	1.36 - 2.72
Abnormally elevated mood	1.0	12.8	20.8	10.0**	2.95 - 33.9	0.55	0.19 - 1.52	0.06**	0.03 - 0.13
Depersonalisation / derealisation	0.9	16.7	5.9	11.5**	3.82 - 34.9	3.15*	1.06 - 9.33	0.19**	0.08 - 0.44
Attention/Activity									
Restlessness / fidgetiness	19.9	33.3	13.3	6.06**	2.79 - 13.2	3.33*	1.49 - 7.46	0.51*	0.33 - 0.79
Gross over activity	8.7	15.4	10.4	6.33**	2.27 - 17.6	1.55	0.57 - 4.22	0.28**	0.16 - 0.49
Markedly Impulsive^	34.3	42.1	19.0	1.59	0.61 - 4.19	2.83	0.89 - 8.93	1.43	0.80 - 2.57
Clumsiness and poor coordination	6.7	10.3	5.2	3.24*	1.05 - 10.0	2.17	0.61 - 7.68	0.61	0.31 - 1.17
Impaired concentration	30.0	60.7	47.5	5.99**	2.62 - 13.7	1.72	0.72 - 4.09	0.29**	0.19 - 0.45

^post 1992 data only ‡taken as reference * p< 0.05 **p< 0.001

	Aggressive only (N=1346) (%)	**Co-occurring (N=39)** (%)	**Psychosis only (N=173)** (%)	Group Contrasts					
				Co-occurring vs. Aggressive		Co-occurring vs. Psychosis		Aggressive vs. Psychosis	
				OR	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Speech & Language									
Impaired use of language for social communication^	7.6	21.1	13.8	6.53*	1.73-24.6	2.60	0.57-11.9	0.32*	0.15-0.69
Somatic									
Disturbance of sleeping	11.7	31.6	33.9	2.69*	1.29-5.62	0.89	0.42-1.91	0.32**	0.22-0.47
Relationships									
Overt Disturbances									
Overt Disturbance child - mother	55.6	61.1	33.3	1.07	0.53-2.14	3.15*	1.49-6.63	2.32**	1.67-3.22
Overt Disturbance child - father	41.6	46.9	28.7	0.96	0.47-1.98	2.21*	1.01-4.82	1.86**	1.31-2.64
Overt Disturbance child – siblings	37.9	26.5	18.8	0.66	0.30-1.44	1.55	0.66-3.66	2.22**	1.51-3.26
Overt Disturbance child - other adults	47.2	35.1	14.3	0.50	0.25-1.01	3.59*	1.56-8.23	4.74**	3.19-7.03
Overt Disturbance child - other children	52.3	59.0	36.8	1.59	0.82-3.09	2.51*	1.23-5.12	0.94	0.97-1.78
Social interaction									
Socially disinhibited	12.3	26.3	13.9	3.24*	1.49-7.05	2.28	0.97-5.33	0.61*	0.39-0.95
Autistic-type disturbance of social interaction /relationships	7.1	23.7	17.9	4.12**	1.81-9.38	1.43	0.61-3.32	0.33**	0.21-0.52

^post 1992 data only ‡taken as reference * p< 0.05 **p< 0.001

Family history and psychosocial adversity

Data on family history, family relationships, parenting and exposure to psychosocial adversities are presented in Table 3.6. Aggressive-only cases were significantly more likely than those in the psychosis-only group to suffer from lack of parental warmth, family discord and poor family communication. Aggressive-only cases were also markedly more likely than those in the psychosis-only group to be assessed as experiencing inadequate parental control and were significantly more likely to be exposed to abuse than those in the psychosis-only group.

Although the groups did not show statistically significant differences in terms of family psychiatric history or deviance and mental disorder in parents, the rates were somewhat higher for the co-occurring group compared to either pure group. Despite their high rates of antisocial behaviour, co-occurring cases were coded as having relatively low levels of difficulty in terms of inadequate parental control. Young people in the co-occurring group did not differ from those in the psychosis-only group in terms of exposure to abuse, but were significantly less likely to be victims of abuse than those in the aggressive-only group. Although rates were low, co-occurring cases also resembled the psychosis-only group in being more likely to have suffered family persecution and being migrants compared to those in the aggressive-only group. Once again, tests for gender x group contrast interactions found no significant effects.

Table 3.6: Family history & psychosocial adversity

	Aggressive only (N=1346) (%)	**Co-occurring (N=39)** (%)	**Psychosis only (N=173)** (%)	Group Contrasts					
				Co-occurring vs. Aggressive		Co-occurring vs. Psychosis		Aggressive vs. Psychosis	
				OR	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Family Psychiatric History									
Mental disorder present in other family members	25.0	38.5	26.0	1.87	0.58-6.08	1.79	0.52-6.12	0.89	0.50-1.57
Parent/sibling committed suicide /seen psychiatrist	32.4	27.3	41.2	0.85	0.38-1.89	0.53	0.23-1.23	0.70	0.49-1.00
Parental mental disorder / deviance present^	26.2	34.5	21.8	1.36	0.61-3.05	1.88	0.79-4.53	1.16	0.76-1.77
Intrafamilial relationships									
Lack of warmth	25.5	17.9	13.8	0.43	0.16-1.20	1.36	0.45-4.05	2.68**	1.61-4.46
Intrafamilial discord	43.2	32.1	31.2	0.46	0.20-1.05	1.06	0.44-2.55	2.19**	1.48-3.26
Inadequate intrafamilial communication	31.7	25.5	20.1	0.59	0.18-1.15	1.28	0.48-3.38	2.34**	1.48-3.71
Parenting									
Hostility towards child^	24.2	18.7	15.1	0.49	0.13-1.86	1.63	0.35-7.58	1.98	0.96-4.05
Parental overprotection^	12.7	17.6	16.4	1.10	0.29-4.12	1.18	0.27-5.15	0.91	0.44-1.87
Inadequate parental control	44.4	16.7	14.6	0.21*	0.08-0.57	1.26	0.42-3.74	5.05**	3.14-8.14
Parenting Situation									
Isolated family^	6.9	20.0	7.5	3.14	0.79-12.4	3.16	0.59-16.8	0.64	0.25-1.60
Adverse life events									
Abuse (physical or sexual)	23.9	15.4	9.9	0.32*	0.10-0.99	1.55	0.44-5.48	3.99**	2.13-7.46
Loss of a love relationship^	14.1	16.7	10.5	2.02	0.52-7.81	1.87	0.39-9.04	0.93	0.43-2.03
Negatively altered patterns of family relationships^	24.1	23.5	12.7	0.89	0.28-2.88	1.93	0.47-7.98	1.80	0.89-3.65
Personal frightening experience^	9.5	13.3	7.3	1.11	0.23-5.23	2.19	0.34-14.1	1.42	0.56-3.56
Persecution	3.3	10.3	6.1	3.96*	1.09-14.4	1.87	0.45-7.68	0.42*	0.19-0.89
Migration	5.2	16.7	8.9	4.19*	1.47-11.9	2.10	0.67-6.59	0.43*	0.23-0.80

^post 1992 data only ‡taken as reference * p< 0.05 **p< 0.001

3.4 Discussion

This study used data on a large sample of out-patient and inpatient referrals to examine childhood and adolescent characteristics of the pattern of co-occurring psychosis and aggression consistently reported in adult samples. The first aim was to compare characteristics of young people with psychosis who did and did not show associated aggression in this clinical sample. Second, based on suggestions that predictors of offending/violence in adults with schizophrenia may be similar to those in non-psychotic samples (Eriksson et al., 2010), a comparison group of referred young people with marked evidence of aggressive behaviour without psychosis was also included.

The results showed that approaching one in five young people who met diagnostic criteria for psychosis had evidence of associated aggression, while only a small minority of predominantly aggressive young people - just under 3% - showed evidence of psychosis. These levels of overlap between psychosis and aggression are similar to those reported in adult clinical studies that have shown that around 20% of those diagnosed with schizophrenia had been violent before hospitalisation (Walsh et al., 2002).

From the current limited evidence it was hypothesised that rates of behavioural problems, substance abuse and exposure to adverse experiences in the co-occurring group would be higher than in psychosis-only cases, and similar to those of aggressive-only cases.

Consistent with the proposed hypotheses, co-occurring cases resembled aggressive-only cases (and differed from the psychosis-only group) in levels of associated behavioural problems and exposure to some adversities, though predicted group differences in rates of substance use were not confirmed. Further details for each group and their associated features are provided below.

3.4.1 Co-occurring cases in comparison with psychosis-only and aggression-only cases

Overall, the analyses suggested that the co-occurring group had most in common with psychosis-only cases; they resembled them (and differed from other aggressive young people) on indicators of socio-demographic background, and also in showing high rates of emotional symptoms, speech and language problems, sleep difficulties and poor concentration. Gender distributions in co-occurring cases were similar to those in the psychosis-only group; formal tests for interactions with gender failed to identify any significant effects, however, suggesting that the patterns of group differences observed on other variables applied in similar ways to boys and girls. Co-occurring cases clearly differed from other young people with psychotic symptoms, however, in having 'overt' relationship disturbances with parents and other adults, elevated rates of irritability (recently attracting attention because of its association with both externalising and internalising behaviours (Stringaris & Goodman, 2009b)), and non-aggressive as well as aggressive conduct problems. Indeed, probably the most striking feature of the co-occurring cases was their high burden of symptoms of all kinds. In particular, young people in the co-occurring group showed higher rates of depersonalisation/derealisation, intrusive thoughts, restlessness, and socially disinhibited behaviours than those in either of the pure groups. Symptoms of this kind may thus be especially characteristic of a subset of young people with psychotic

symptoms who are at risk of developing associated aggression; further studies will be needed to confirm this possibility.

Consistent with the adult literature, young people presenting with both psychosis and aggression were more likely to be from low social class backgrounds and to have had prior contact with the police and care homes/institutions. Somewhat surprisingly, no significant differences were found across the groups in terms of substance abuse. We should note here, however, that the Item Sheets recorded evidence of substance *abuse*, rather than simple use of drugs or alcohol; given the relatively young age of the current samples, indicators of this kind might have been needed to identify group differences. Given the known association between maltreatment and aggressive behaviour (Moffitt & Scott, 2008) as well as the recent interest in associations between maltreatment and psychosis (Read et al., 2005), it had been anticipated that rates of maltreatment might be especially elevated in the co-occurring group. In practice, however, rates of physical and sexual abuse were significantly lower than in the aggressive only group (and lower again in the psychosis-only group). Of note here, however, is that these reports were made by parents; self-reports might provide a more appropriate basis for clarifying associations with co-occurring psychosis and aggression.

Interestingly, antisocial behaviours in the co-occurring group seemed to have arisen in the absence of the high rates of family problems or poor parenting, and in particular the inadequate parental control, clearly evident in the aggressive-only cases. Co-occurring cases were, however, reported to have somewhat higher levels of parental mental disorder or deviance than other young people with psychosis (although it is important to note these comparisons were based on limited data and

the power to detect differences was reduced to some extent). One speculative interpretation of these findings could thus be that although lacking the usual psychosocial/environmental risk factors for antisocial behaviour, these young people may have nonetheless faced an increased familial loading associated with other parental characteristics. Once again, replications in other samples would be needed to test this possibility.

3.4.2 Strengths and limitations of the study

This study was based on a large database with systematic data on a wide range of symptoms and associated psychosocial circumstances. Item sheet ratings have shown suitable levels of reliability and have been informative in previous studies of psychosis in children and adolescents (Hollis, 1995; Hollis, 2000; Garralda, 1984; Cannon et al., 2001). Alongside these strengths, a number of limitations should also be taken into consideration. Firstly, for the definition of psychosis, diagnoses of affective as well as non-affective psychoses were included. As outlined earlier, however, previous studies have also noted a lack of diagnostic stability in child and adolescent samples (McClellan et al., 2002), and in our own sample levels of overlap with aggression were very similar in those with and without affective symptoms. Replications in more specifically-defined samples would nonetheless be valuable. Secondly, our focus on diagnostically-defined groups inevitably meant that those who might have been in the prodromal stage were not included. Thirdly, although the sample had adequate power to detect differences between the three selected groups in the majority of the analyses, power was inevitably reduced to some extent in analyses based on the subset of variables only recorded for more recent cases. As a consequence, there are limits to the conclusions that can be made on these specific

variables; the smaller Ns available for these variables also precluded multivariate analyses, which would have been a valuable approach to highlight key independent predictors of group differences (see e.g. Cannon et al, 2002). Finally, due to the cross-sectional nature of the assessments we could not be certain about the ordering of onset of psychosis and aggressive behaviour among co-occurring cases, or the relative ordering of onset of the clinical characteristics and psychosocial adversities in relation to psychosis/aggression.

Conclusion

The findings demonstrate that it is possible to identify co-occurring aggressive behaviour and psychosis in clinically-referred child and adolescent samples. This study provides a description of some of the key characteristics of young people with psychosis and co-occurring aggressive behaviour. As outlined, the co-occurring group resembled other young people with psychosis in many ways, spanning both socio-demographic background indicators and high rates of emotional symptoms including elevated mood, sleep problems and poor concentration. In line with the adult literature (and differing from the psychosis-only cases), young people presenting with both psychosis and aggression had increased contact with both police and child care authorities. Co-occurring cases also presented with elevated rates of depersonalisation/derealisation, intrusive thoughts and restlessness, and were more likely to have received past treatment compared to both psychosis-only and aggressive-only cases. If replicated, these factors might be early indicators of risk for aggression in individuals with psychosis. Building on the current study, the next chapter will focus on an inpatient sample from both general adolescent units and adolescent medium secure units. Given the relative rarity of the groups of interest,

data on these samples, particularly the young offenders (known to have elevated rates of psychosis (Fazel, Doll & Langstrom, 2008), may offer further insight into this dual pattern.

Chapter 4

Inpatient Study - Introduction & Method

4.1 Introduction

This chapter provides background to the second empirical study to be reported in this thesis, based on an inpatient sample. As outlined in chapter two, a number of adult studies have used inpatient samples when examining the relationship between schizophrenia and violence. Studies utilising samples in general psychiatric hospitals (Hodgins et al., 2008, Swanson et al., 2002), medium secure centres (Baxter et al.,1999) as well as high security settings (Taylor et al. 2008a) have all identified factors associated with violence in patients with schizophrenia/psychosis. Baxter et al., (1999) followed up a cohort of 63 patients with schizophrenia treated in medium secure units and found the group had high levels of previous inpatient psychiatric care (86%), violent offending (68%), substance abuse (71%), alcohol abuse (29%), histories of conduct disorder (48%) and periods in care (22%). Taylor et al. (2008a) compared complete national cohorts of high security hospital patients that were resident during the same time period in Scotland and in England. Comparing individuals with 'pure' psychosis and those with psychosis and comorbid personality disorder, the authors reported psychotic symptom drive to serious violence was more likely among those without comorbidities, regardless of sex, ethnic group, offence group or national cohort.

To our knowledge, only one previous study has reported on factors associated with violence in an adolescent inpatient sample. Clare and colleagues (2000) reported a retrospective case note study of two groups of 12-18 year-olds admitted to two inpatient units with a diagnosis of psychosis. Fourteen young people with histories of violent behaviour resulting in police cautions or criminal proceedings were compared with 25 cases with no history of criminal violence. The two groups did not differ on psychopathological variables (including delusions, hallucinations and elevated or fluctuating mood), but violence was associated with exposure to physical and emotional abuse, previous psychiatric and offending histories, and higher rates of contact with social services and admissions to public care.

Exploring these issues further, psychosis/aggression associations among young people in general adolescent and medium secure (forensic) inpatient units were investigated. Whereas study one allowed us to examine a range of associated features of psychosis and aggression, the current study enabled us to expand on those findings by examining additional features of antisocial behaviours such as callous and unemotional traits, as well as additional features of psychosis such as threat/control-override (TCO) symptoms and duration of treated psychosis. Furthermore, in this study it was possible to investigate additional clinical symptoms of mania and PTSD as well as medication compliance and victimisation of the young person.

4.1.1 Research question

Are the risk factors and correlates of co-occurring psychosis and aggression similar to or different from those for psychosis or aggression only?

4.1.2 Research hypothesis

Co-occurring cases would be similar to aggressive-only cases (and differ from psychosis-only cases) with respect to callous and unemotional traits, non-aggressive antisocial behaviours and levels of victimisation. Further, co-occurring cases would have higher rates of TCO symptoms compared with psychosis-only cases.

4.1.3 Research aims and objectives

As in study one the aims of this study were to compare three groups of young people - those with psychosis only (where, as in study one, examinations of the broader category of psychosis were chosen given the marked diagnostic instability in childhood and adolescence (McClellan et al., 2002)), those with aggression only, and those with both psychosis and co-occurring aggression on a range of variables including socio-demographics, behaviour, clinical characteristics and psychosocial risk factors.

Study settings

For this study, inpatient units - both general and medium secure units - that provide specialist care within child and adolescent mental health services (CAMHS) were chosen. CAMHS can be conceptualised as consisting of four tiers of services that provide a framework for inter-agency co-operation, that work with children whose difficulties are increasingly complex and severe in higher tiers (Health Advisory Service, 1995. Together We Stand). As shown in Figure 4.1, the first two types of units in Tier 4 which are highly specialised services that treat young people with severe and complex problems were chosen.

As in adult services, general adolescent and medium secure units differ in some of their approaches to patients. Whereas medium secure units admit and treat young people with both severe mental illness and aggressive behaviour/criminality, general units tend not to admit young people with a diagnosis of conduct disorder. Some general units cite conduct disorder / violence as an exclusion criterion for admission, while all would incorporate an assessment of behaviour and risk of violence into their pre-admission assessment so as to avoid admitting a young person whose behaviour could not be managed safely within their unit. Further details of each type of unit that participated in the inpatient study are provided below.

Figure 4.1: A Tiered Model of CAMHS (Health Advisory Service, 1995. *Together We Stand*)

Tier 1

PRIMARY CARE PROFESSIONALS PROVIDING NON-SPECIALIST CAMHS			
Health visitors	GPs	Teachers	Social workers

Tier 2

INDIVIDUAL PROFESSIONALS WHO RELATE TO OTHERS THROUGH A NETWORK				
Clinical nurse specialist	Child & adolescent psychiatrist	Clinical psychologist	Community paediatrician	Hospital paediatrician

Tier 3

SPECIALIST CHILD ADOLESCENT MENTAL HEALTH SERVICES
Specialist multi-disciplinary child and adolescent mental health services (CAMHS) providing assessment, treatment and consultation to children, their families and carers. Specialist CAMHS are usually comprised of psychiatrists, clinical nurse specialists, family therapists, psychologists and creative therapists.

Tier 4					
HIGHLY SPECIALIST TERTIARY LEVEL CAMHS					
Medium Secure adolescent units	General adolescent inpatient units	General child inpatient units	Eating disorders units	Specialist Community: Forensic Adolescent Consultation and Treatment Service (FACTS)	Regional specialist outpatient teams for specific disorders

General adolescent inpatient units

General units are defined by the age range of young people who they work with rather than a focus on children with a particular type of difficulty. They tend to work with young people aged between 12 to 18 years, although not all individual units span this complete range. The majority of units attempt to address the needs of those adolescents with the most severe mental health problems and are expected to treat adolescents with the full range of psychiatric disorders, although as noted above, conduct disorder is an exclusion criterion in many general units. Both the NHS and the independent sector provide inpatient services of this kind, and although in some circumstances it may be necessary to detain young people under the Mental Health Act (1983), many are admitted on a voluntary basis. Recent national figures suggest that the proportion of NHS psychiatric hospital inpatients that had not spent any time detained under the Mental Health Act during a spell of care in 2010/11 was 59%. In contrast, from 2009/10 to 2010/11 the number of people who spent time in hospital as a result of being formally detained rose by 0.8% (from 42,479 – 42,818) but more specifically, the number of people who were detained via the criminal justice system (court and prison disposals) rose by 8.2% from 3,769 to 4,078 (Mental Health Bulletin, 2011). Unfortunately figures specific to adolescents were not available.

Adolescent medium secure units

Medium secure units largely provide forensic mental health care which involves the assessment and treatment of those who are both mentally disordered and whose behaviour has led to or could lead to offending (Mullen, 2000). Medium secure unit beds are provided by both the NHS and the independent sector. Adolescents placed

in secure units are thought to present a significant risk to themselves or others and therefore cannot be safely cared for in an open setting. Secure care is provided under the Mental Health Act (1983) for young people aged between 12 and 18 years with challenging or dangerous behaviour, severe psychiatric disorder that requires specialised treatment and rehabilitation, or those adolescents who may have committed criminal offences.

4.2 Method

4.2.1 Design

A cross-sectional study with information collected from face-to-face interviews with young people, interviews with key-worker nurses, and data extracted from medical notes.

4.2.2 Unit Recruitment

Interviews with young people took place in adolescent inpatient units between April 2009 and April 2011. Initially 12 inpatient units across Southern England were approached to take part in the study. Of these, six were general adolescent units (GAUs) and six were medium secure units (MSUs). Of the six medium secure units approached, two declined to take part in the study and one had closed down by the time data collection began (with existing patients being transferred to other medium secure units that were part of the study). One general unit was subsequently forced to exit from the study due to lack of staffing. Data collection began in the eight

remaining sites (5 GAUs and 3 MSUs). As the study progressed a further two medium secure units were recruited (from the Midlands and the North of England) where it was known young people with clear risky behaviour as well as mental illness resided, in order to help increase the sample size in key groups of interest for the study. The final unit types thus consisted of 5 general adolescent and 5 medium secure units. Ethical approval for the study was granted by the Research Ethics Committee of the Institute of Psychiatry and South London and Maudsley NHS Trust.

4.2.3 Study Protocol

The initial protocol was designed to include 90 minute interviews with young people aged 12 to 18 years old, interviews with their parents/carers, and briefer 20 minute interviews with their key-worker nurses, as well checking of medical files. Exclusionary criteria were: 1) a primary diagnosis of eating disorder (as patients with eating disorders tend not to display symptoms of psychosis or physical aggression); 2) severe learning disability; and 3) insufficient English to complete the interview. Patients too ill to consent early in their admission were contacted when symptoms had remitted.

Unfortunately, many of the young people in general adolescent units were placed far away from their homes and families, and many young people in medium secure units did not have any contact with their families. As a result it quickly became apparent that it would not be feasible to carry out interviews with parents/carers or to obtain signatures from them for consent to speak with young people under the age of 16. The inclusion criteria were thus amended to focus on patients aged 16 years or over,

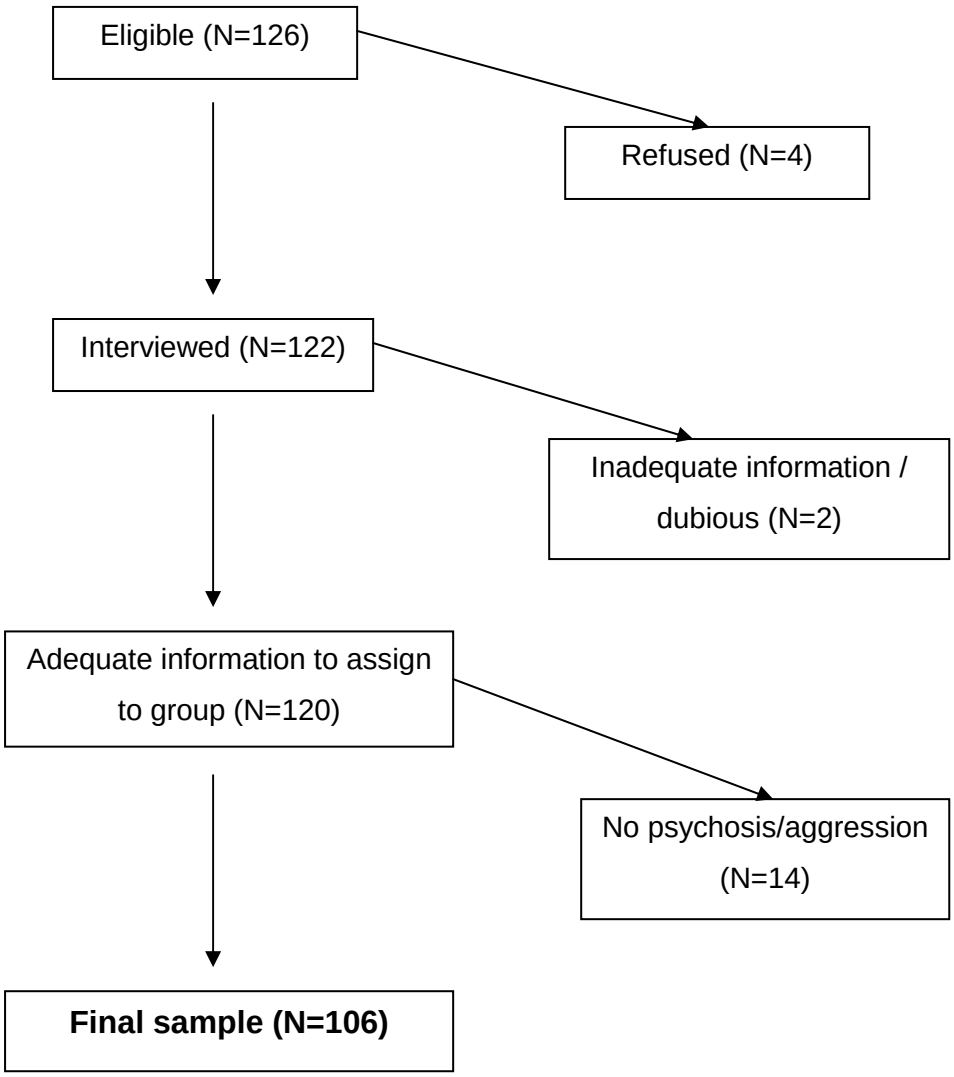
and the protocol was amended to include 90 minute interviews with young people, 20 minute interviews with nursing staff, and extraction of data from the medical notes.

Initially it was planned that all patients admitted to the study units and who met the study criteria should be interviewed. An audit of progress in January 2010 highlighted that a number of the young people interviewed by that point did not meet criteria for either psychosis or behavioural problems. A decision was thus made to ask consultant psychiatrists to 'filter' patients i.e. the consultant psychiatrists were given the following inclusion criteria and asked to identify patients for the research: 1) aged 16 years or over, 2) psychotic symptoms and/or any antisocial behaviour, 3) no primary diagnosis of eating disorder, 4) no severe learning disability, 5) well enough to complete a 90 minute interview.

Sample: inclusion process and unit type

The process of inclusion and exclusion into the final sample is provided in Figure 4.2. From the initial eligible sample (n=126), only 4 young people refused to take part, leaving 122 young that were interviewed. Of these, two cases were dropped due to inadequate or dubious information and 14 cases did not meet relevant criteria to be assigned to a diagnostic group of interest for this study (i.e. no psychosis or antisocial behaviour). Of the remaining 106 young people, 53 were recruited from GAUs (range 2 to 24 in individual units) and 53 were recruited from MSUs (range 2 to 31).

Figure 4.2: Sample flowchart



4.2.4 Interview Procedure

All interviews were carried out with the permission of the relevant consultant psychiatrist. All patients meeting the eligibility criteria were invited to participate. The young person's key-worker nurse was informed of the study and asked to speak with the young person about the study. On agreement with the young person a meeting

was arranged between them and the researcher at the inpatient unit to further explain the project and answer any questions. Written consent for participation was sought, as well as authorisation to speak to their key-worker nurse, and authorisation to access to medical records. Copies of the information sheets and consent forms are included in appendix 4.1.

If the patient consented, an interview was conducted (which included verbal administration of questionnaire measures) with the patient; the researcher then interviewed the key-worker nurse; and finally checked the patient's medical file. Patients were reimbursed for participating in the research interviews with a £10 voucher redeemable at various high street stores.

4.2.5 Measures

1. Clinical Interview**:** *The Kiddie-Schedule for Affective Disorders and Schizophrenia, Present and Lifetime Version (Kaufman et al., 1997)*

To assess psychiatric diagnoses, a range of measures were investigated and narrowed the search to two, 1) the Diagnostic Interview Schedule for Children (DISC; Shaffer et al. 2000) and 2) the K-SADS PL (Kaufman et al., 1997) The latter was chosen because of its psychometric properties (outlined below), its inclusion of questions on life-time histories of disorder, and its being freely available. Most importantly, in contrast to the DISC which is highly structured, the semi-structured nature of the K-SADS PL allowed for flexibility and a more conversational tone in the interviews which was preferable with such a vulnerable client group.

The K-SADS-PL is capable of generating 32 DSM IV Axis I current and past psychiatric diagnoses. The components of the K-SADS-PL are described below.

Introductory Interview: The introductory interview is used to establish rapport. It is essential and takes approximately 10 – 15 minutes to complete. In this section demographic, presenting complaint and prior psychiatric treatment data are obtained. In addition, information on the young person's school functioning, hobbies and peer and family relations is also collected.

Screen Interview: The aim of the screen interview is to streamline the remainder of the assessment and enhance its efficiency. There are 82 screen symptoms divided into 20 different diagnostic areas. The number of diagnoses assessed with the K-SADS-PL exceeds the number of screen areas as some diagnostic areas screen for multiple disorders. At the conclusion of the screen section for each diagnostic area, skip-out criteria are delineated for current and past episodes of the disorder. The interviewer can skip out of the supplement for a given diagnostic area if the young person does not receive a threshold score on any of the symptoms surveyed in that section of the screen interview. The diagnostic supplement for a given area is administered if the young person receives even one threshold rating on the screen. If all skip-out criteria are met, the K-SADS-PL interview is completed after administration of the screen interview.

For the purposes of this research certain sections of the screening tool were not utilised as they were not deemed relevant to the study. The sections excluded for the screen related to eating disorders, enuresis, encopresis, agoraphobia, separation anxiety disorder, obsessive compulsive disorder and tic disorders. Other areas such as attention deficit hyperactivity disorder (ADHD) and autism spectrum disorders

(ASD), intended to be completed by a parent/carer or teacher (which, as outlined earlier, was not possible in this study) were initially hoped to be completed by the patient's key-worker nurse instead. Unfortunately, as many of these questions were of a historical nature, nurses were unable to answer them and could only provide an overall diagnosis (where relevant) from the medical files. As a result, information about these areas is poor. The final screen sections used were: 1) depressive disorders, 2) mania, 3) psychosis, 4) panic disorder, 5) social phobia, 6) general anxiety, 7) ADHD, 8) ASD, 9) behavioural disorders – Oppositional Defiant Disorder (ODD) & Conduct Disorder (CD) 9) Tobacco, alcohol & substance use and 10) Post Traumatic Stress Disorder (PTSD).

Diagnostic Supplements: The K-SADS-PL has five DSM IV diagnostic supplements: 1) affective disorders; 2) psychotic disorders; 3) anxiety disorders; 4) behavioural disorders (ODD was included without the CD exclusionary criterion); and 5) substance abuse, eating and tic disorders. The skip-out criteria in the screen interview specify which section(s) of the supplements, if any, should be completed.

Where screen sections were removed, supplements for these areas were also removed. In addition, supplement sections were not completed for panic disorder, social phobia, general anxiety, ADHD, and ASD for two reasons. Firstly, the first three areas were not considered pertinent enough to the study to go into them in detail, and (as explained above) the nurses did not have enough symptom knowledge to be asked detailed questions about ADHD and ASD (nor did they have the time to carry out a longer interview). Secondly, due to the practicalities of the way an in-patient unit is run, with a set timetable of activities and therapies throughout the day, the researchers were limited in the amount of time that they could spend with the young people. Consequently, it was important to focus the interviews on only

what was vital to the research questions. Information on which screening and supplement sections were included in the final instrument, along with the number of their corresponding symptoms, is provided in Table 4.1.

Table 4.1: Final screen & supplement sections completed with the number of symptoms

Screen Completed	Number of screen symptoms	Supplement Completed	Number of supplement symptoms
Depression	4	Yes	11
Mania	5	Yes	12
Psychosis*	2	Yes	25
Panic disorder	1	No	N/A
Social phobia	1	No	N/A
General anxiety	3	No	N/A
ADHD (nurse rated)	4	No	N/A
ASD (nurse rated)	5	No	N/A
ODD	3	Yes	9
CD*	5	Yes	14
Tobacco, alcohol & substance use	18	Yes	30
Post-traumatic stress disorder.	17	No	N/A

**Screen and supplement questions from the K-SADS PL can be found in appendix 4.2*

Coding symptoms: K-SADS-PL symptoms are coded according to whether they are present currently, or have been experienced in the past. For *current* diagnoses, symptoms are rated for the time period when they were the most severe during the episode. An episode is considered 'resolved' or '*past*' if the young person has had a minimum of two months free from the symptoms associated with the disorder.

Episodes rated in the 'past disorders' section represent the most severe past episode experienced of that given disorder.

Scoring: The majority of K-SADS-PL items are scored using a 0-to-3 point rating scale. Scores of 0 indicate no information, scores of 1 suggest the symptom is not present, scores of 2 indicate sub threshold levels of symptomatology, and scores of 3 represent threshold criteria. The remaining items (focusing predominantly on impairment) are rated on a 0-to-2 point rating scale (0=No information, 1=No, 2=Yes).

Psychometric Properties: Kaufman (1997) tested the psychometric properties of the K-SADS PL using a sample of 55 psychiatric outpatients and 11 controls (aged 7 to 17). Rating scale data supported concurrent validity of the screen section and diagnoses. Inter-rater agreement on scoring screens and diagnoses was high (93% to 100%). Test-retest scores were in the excellent range for present and/or lifetime diagnoses of major depression, any bipolar, generalised anxiety, oppositional defiant and conduct disorder (k=0.77 to k=1.00) and in the good range for present diagnoses of PTSD and ADHD (k=0.63 to k=0.67). These findings were comparable with what has been reported by other investigators using semi-structured and fully structured child diagnostic interviews (Herjanic and Reich, 1982; Hodges et al., 1982; Shaffer et al., 1993).

4.2.5a Interviewer training

I conducted the majority of the interviews (54%) and others were conducted by three specialist trainees in child and adolescent psychiatry and a research worker with an

MSc in Psychology. As a semi-structured interview, the K-SADS-PL required intensive training. I was trained by a Child and Adolescent Consultant Psychiatrist with several years experience of administering the tool. Training consisted of discussing the interview schedule, listening to audio tapes of existing interviews and then observing the K-SADS-PL being administered to a patient and being observed administering it myself. Once I had been trained it was deemed appropriate for me to train the other researchers on the K-SADS PL as well as the other instruments.

Inter-rater reliability of K-SADS in this study

Procedure

Where patient consent was provided, interviews were audio taped. 21 interviews conducted by the other interviewers were audio taped in this way. Of these, 15 were randomly selected for the purpose of obtaining inter-rater reliability estimates. I independently rated these audiotapes, blind to the results of the initial interview and all other information about the young person.

Statistical analysis

The levels of agreement between interviewers were tested by using Cohen's kappa. Criteria proposed by Landis and Koch (1977) were used to interpret the K coefficients: *excellent reliability, k>0.75*; *good reliability, K=0.59 to 0.75*; *fair reliability, K=0.40 to 0.5*8 and *poor reliability, k<.40*.

Results

Three sets of tests were undertaken: 1. agreement on screen symptoms; 2. agreement on 'skip out' criteria (i.e. whether or not to continue to the supplement section); and 3. agreement on diagnoses.

There were 28 screening items in total. Of the 23 that determined whether a supplement needed to be completed, reliability estimates for 20 were excellent (k>0.75) and for three were good (k>0.68) for current episodes. The same results were found for past episodes. Of the remaining five current screening items (that did not require supplements to be completed i.e. GAD, panic attacks and social phobia), agreement on one was fair (k>0.40); two were good (k>0.69) and two were excellent (k=1.00). For past episodes, four were good (k>0.59) and one was excellent (k=1.00)

Agreement on the scoring of the skip-out criteria determining the need to complete the diagnostic supplements was 100% for current episodes. Agreement for lifetime episode skip-out criteria was 86.7%. There was disagreement on whether or not to complete diagnostic supplements in two 'lifetime' cases; in both instances, the raters who went on to complete the supplements agreed that no diagnoses could be assigned.

Inter-rater reliability on current diagnoses was excellent: there was 100% agreement (k=1.00) on Major Depressive Disorder, Schizophrenia, Schizoaffective Disorder, ODD and Substance Misuse, and approaching 100% agreement on Conduct Disorder (k=0.865 CI 0.611-1.000). It was not possible to obtain kappa estimates for Bipolar Disorder as there were too few ratings (n<5), but there was 100% agreement on those that were made. Within this small sample of 15 cases it was not possible to

obtain kappa agreement for past diagnoses as there were insufficient ratings to justify this (n<5). Using percent agreement instead, however, there was 100% agreement for Major Depressive Disorder, Schizophrenia and Schizoaffective Disorder and 93.3% agreement for ODD, Conduct Disorder and Substance Misuse.

2. Aggressive Behaviour: *The MacArthur Community Violence Instrument – (MCVI) (Steadman et al. 1998)*

This tool records both aggressive behaviour and victimisation, and has been used in a number of studies of the relationship between mental disorder and violence in adult samples (Swanson et al., 2008, Hodgins et al., 2007, Large et al., 2010). Participants are asked whether they have engaged in several categories of aggressive behaviour in the past 6 months, 12 months or ever in their lifetime. These aggressive behaviours consist of 1) 'throwing something at someone', 2) 'pushing, shoving, grabbing', 3) 'slapping', 4) 'kicking, biting, choking', 5) 'hitting, punching someone', 6) 'trying to physically force someone to have sex against their will', 7) 'threatening someone with a knife, gun or other weapon', 8) 'using a weapon on someone', 9) 'hurting someone so badly they required hospital treatment', and 10) 'any other violent act towards another person'. If a positive response is given, detailed information is obtained about each act, including the target and location.

Steadman et al. (1998) separated items into (i) 'violence' - defined as any assault using a lethal weapon or resulting in injury, any threat with a lethal weapon in hand, or any sexual assault, and (ii) 'aggressive acts' defined as simple battery without injury or weapon use. However there is not one standard way to define violence/aggression using the MCVI, and later studies using this measure have

chosen to either examine each item separately (Hodgins et al, 2007) or to combine all items together to index 'violence' (Swanson et al, 2008).

3. Callous & Unemotional Traits: *The Inventory of Callous-Unemotional Traits (ICU) (Frick, 2003)*

A variety of measures have previously been used to measure psychopathic traits in young people. Two of the most widely used are the Psychopathy Checklist: Youth Version (PCL: YV; Forth, Kosson, & Hare, 2003) and the Antisocial Process Screening Device (APSD; Frick & Hare, 2001). Both have both strengths and limitations. The PCL: YV combines a review of the person's institutional chart with a semi-structured interview, making it time-consuming and, moreover, it contains only four items that specifically assess CU traits. The APSD relies on parent, teacher (Frick & Hare, 2001), or self-report (Munoz & Frick, 2007) to assess CU traits and, as a result, is more applicable for nonclinical samples. However, the few items (n=6) and limited number of response options (n=3) may restrict the range of scores on the measure.

The Inventory of Callous and Unemotional questionnaire (Frick, 2003) was based on the APSD and was developed to overcome its psychometric limitations and provide a more comprehensive assessment of callous–unemotional traits. The ICU was chosen because despite it being a detailed measure of CU traits, it is not time-consuming to administer and is available in different versions (there are parent, teacher, and self-report versions of the ICU available, with the self-report being the most widely used). The ICU consists of 24 items which are rated on 4-point Likert scales: 0 (not at all true), 1 (somewhat true), 2 (very true) and 3 (definitely true). Scores are summed to provide an overall psychopathy score. From the 24 items, three psychopathy

subscales were theoretically defined (Frick, 2003) by grouping and summing specific items reflecting callousness, uncaring and unemotional traits.

Validation of the tool through confirmatory factor analyses (by Essau et al, 2006 Kimonis et al. 2008, Roose et al. 2009) has established that the total ICU scale consists of three relatively independent dimensions of different aspects of CU traits: “callousness” (lack of empathy, guilt, and remorse for misdeeds), “uncaring” (lack of caring about ones performance in tasks and for the feelings of others), and “unemotional” (absence of emotional expression). Tests of the psychometric properties of the scale within adolescent offender samples (Kimonos et al 2008) showed good internal consistency for the total score (α=0.81) and good to acceptable reliability for the 3 subscales: uncaring (α=0.81), callousness (α=0.80) and unemotional (α=0.53).

The results of our own reliability testing were similar, with good internal consistency for the total score (α = 0.83) and good to acceptable for the subscales: uncaring (α = 0.82), callousness (α = 0.77), unemotional (α = 0.64).

Remaining measures

A full list of the remaining measures which were obtained from the young person (and corroborated by checking their medical notes) is outlined below in Table 4.2.

Table 4.2: Description of remaining measures investigated for psychosis / aggression associations

Variable	**Definition / Code**
Gender	Male / female
Age	16 to 18
Ethnicity	White / non-white
Family situation	Living with family members vs. living without family members
Developmental impairment*	Delays in milestones - walking, talking. Yes / No
Educational status	1. Not at school/dropped out 2. Regular school/college 3. SEN / Behavioural and Emotional difficulties school
School suspension/expulsion	Yes / No
Sector*	NHS vs. independent
Type of Unit*	GAU vs. MSU
Mode of referral	Criminal justice vs. non-criminal
Mental Health Act status*	Compulsory vs. voluntary
Previous contact with services	Outpatient and inpatient
Forensic/criminal history	Yes / No
Medication compliance	Yes / No
Mental disorder present in other family members	Yes / No
Aggression / violence present in other family members	Yes / No
Social services contact	Yes / No
Maltreatment	Yes / No
Bullied	Yes / No
Victimised	Number of times been victimised in the last year

*****Information obtained from medical notes only

Derivation of variables

In addition to obtaining diagnoses from the K-SADS PL, symptom counts were also used to derive subscales of *Oppositionality* - based on DSM IV Oppositional Defiant Disorder and *Non-aggressive conduct problems* - based on DSM IV non-physically aggressive Conduct Disorder items (and then used the criteria set out by DSM IV to separate this subscale further into *Destruction of property*, *Deceitfulness or theft* and *Serious violation of rules*. Emotional symptom subscales (*Depression, Mania, Anxiety, and PTSD*) as well as psychotic symptom subscales (*Psychosis* – separated further into *Hallucinations, Delusions and Threat Control Override* symptoms *(TCO*)) were also created. Table 4.3 describes all subscales, the items used to create them as well as their internal reliabilities. The internal reliability of subscales ranged from excellent (Cronbach's alpha >0.8) to acceptable (Cronbach's alpha>0.5).

Table 4.3: Full list of derived variables and their internal reliabilities

Subscales	Items used to create subscales	Internal Reliability (α =)
Non-aggressive antisocial behaviour		
Oppositional behaviour (ever) Range (0 - 8)	Loses temper; argues with adults; actively defies or refuses to comply with adults' requests or rules; deliberately annoys people; blames others for his/her mistakes or behaviour; touchy or easily annoyed by others; angry & resentful; spiteful or vindictive.	0.86
Non-aggressive CD behaviours (ever) Range (0 - 8)	Bullies; fire setting; destroyed others' property; broken into someone else's house, building, or car; lies; stolen items of nontrivial value; stays out at night; runs away; truant.	0.82
DSM IV - destruction of property (ever) Range (0 - 2)	Fire setting; destroyed others' property.	0.54
DSM IV - deceitfulness or theft (ever) Range (0 - 3)	Broken into someone else's house, building, or car; lies; stolen items of nontrivial value.	0.60
DSM IV - serious violation of rules (ever) Range (0 - 3)	Stays out at night; runs away; truant.	0.66
Emotional symptoms		
Depressive symptoms – current Range (0 - 19)	Depressed mood; irritable mood; anhedonia; decreased appetite; weight loss; increased appetite; weight gain; insomnia; hypersomnia; psychomotor agitation; retardation; fatigue; lack of energy; tiredness; feelings of worthlessness; excessive/inappropriate guilt; decreased concentration; slowed thinking; inattention; indecisiveness; recurrent thoughts of death; recurrent suicidal ideation (with or without plan); suicide attempt.	0.94

Depressive symptoms – past Range (0 - 17)	As above.	0.94
Mania symptoms – current Range (0 - 12)	Elevated mood; explosive irritability / anger; unusual energy/activity; decreased need for sleep; hypersexuality; grandiosity/inflated self-esteem; pressured speech; racing thoughts; flight of ideas; increased goal-directed activity/sociability; motor hyperactivity/physical restlessness; poor judgment/risky, pleasure-seeking behaviours; distractibility; influence of drugs or alcohol.	0.94
Mania symptoms – past Range (0 - 12)	As above.	0.95
Anxiety symptoms – current Range (0 - 3)	Excessive worries; Somatic Complaints; Marked Feeling of Tension/Unable to Relax	0.66
Anxiety symptoms – past Range (0 - 3)	As above.	0.73
PTSD symptoms (ever) Range (0 - 7)	Car Accident; Other Accident; Fire; Witness of a Disaster; Witness of a Violent Crime; Victim of Violent Crime; Confronted with Traumatic News; Terrorism Related Trauma; War Zone Trauma; Witness to Domestic Violence; Physical Abuse; Sexual Abuse.	0.56
Psychotic symptoms		
Hallucinatory symptoms – current Range (0 -10)	Hallucinations; non-verbal sounds; command hallucinations; running commentary; conversing voices; thoughts aloud; other verbal hallucinations; voices inside head only, voices outside head only; combination of where voices heard; visual hallucinations; tactile hallucinations; olfactory hallucinations.	0.83
Hallucinatory symptoms – past Range (0 - 4)	As above.	0.81

Delusional symptoms – current Range (0 - 11)	Delusions; grandiosity; guilt/sin; delusions of control; somatic delusions; nihilism; thought broadcasting; thought insertion; thought withdrawal; message from TV/radio; delusions of persecution; delusions others can read their mind; delusions of reference; other bizarre delusions.	0.82
Delusional symptoms – past Range (0 - 3)	As above.	0.68
Total psychotic symptoms – current Range (0 - 20)	Both hallucinatory and delusional symptoms as described above	0.88
Total psychotic symptoms – past Range (0 - 7)	As above.	0.81
Threat Control Override (TCO) symptoms – current Range (0 - 1)	Delusions others can read their mind & delusions of reference.	0.66

Current and past episodes of disorder

As reported earlier, the KSADS-PL records symptoms of current and past episodes of disorder. Due to the long lengths of stay in medium secure units, however, it was sometimes difficult to disentangle current and past episodes in areas where the constraints of incarceration meant that young people could not engage in behaviours that they had engaged in prior to admission. As a result any evidence of oppositional defiant disorder, conduct disorder and substance abuse were combined into 'ever' classifications of these disorders. Past / current symptom distinctions were however maintained for all emotional disorders.

Information collected from medical notes

As well as patient reports, information was also obtained from medical files. Although the clinical interviews were our primary source for information, where it was not possible to obtain full details of symptomotology / aggressive acts from the young person, or to make a diagnosis based on the information received, notes from the medical records/medical staff were used to supplement the research interviews. Symptoms and aggressive behaviour reported by either information source were used as positive indicators. Information was extracted from individual case notes using a proforma designed specifically for use in the study and headings were based on discharge summaries completed by consultant psychiatrists (please see appendix 4.3). All 106 medical files were checked by the author.

Discrepancies between the research interview and medical records

Interview-based research diagnoses of psychosis were made prior to any medical files being checked and 84% (n=89) of research diagnoses corresponded to medical record diagnoses. Discrepancies between the two sources largely arose when what was reported to researchers by the young person as psychotic symptoms were described in the medical notes as either 1) pseudo-hallucinations (n=7), or 2) psychotic symptoms present but not considered severe enough (at that stage) to warrant a diagnosis (n=7). There were a further three cases where psychotic symptoms reported by the young person to the researcher, were not mentioned in the medical notes at all. Diagnoses were assigned in these discrepant cases after review of all available information by two consultant psychiatrists. In all cases, the young person's/interview-based account was endorsed.

4.2.6 Final Samples

Psychosis definition

DSM IV criteria were used to define psychosis (outlined below). Symptoms/diagnoses reported by either the young person or in the medical notes were used as positive indicators.

Aggression definition

Aggressive acts either reported by the young person on the MCVI or in the CD section of the K-SADS PL, or recorded in the medical notes, were used as positive indicators of

aggressive behaviour. A range of differing definitions of aggression/violence have been used in studies in adult samples. To ensure that a relatively severe definition of aggression was used, only positive responses to the last seven questions of the MCVI, or to aggressive CD symptoms on the K-SADS PL, were included in the definition (see Table 4.4). Scoring positive on any of these items indicated a positive score for aggressive behaviour. From the total eligible sample of 106, 86 young people met criteria for aggression defined in this way.

Table 4.4: Frequencies of aggressive behaviour for both MCVI and CD sections (Total N=106):

MCVI	**N**	**%**
Kicking, biting, choking	28	26.4
Hitting, punching someone	53	50.0
Trying to physically force someone to have sex against their will	4	3.8
Threatening someone with a knife, gun or other weapon	10	9.4
Using a weapon on someone	3	2.8
Hurting someone so badly they required hospital treatment	36	34.0
Any other violent act towards another person	29	27.4
CD		
Fighting	71	67.0
Weapon use	46	43.4
Aggressive stealing	35	33.0
Forced sex	12	11.3
Animal cruelty	7	6.6
Physically cruel	39	36.8

* Items are not mutually exclusive

The final sample (n=106) included the following 3 groups:

1. *Psychosis-only (n=20)*: Young people who met criteria for a DSM IV diagnosis of schizophrenia (295.30, 295.10, 295.20, 295.90, 295.60), schizophreniform disorder (295.40), schizoaffective disorder (295.70), delusional disorder (297.71), brief psychotic disorders (298.8), substance induced psychotic disorder, psychotic disorder NOS (298.9), or psychotic types of mood affective disorders (296.04, 296.24, 296.44, 296.54, 296.64)

2. *Aggressive-only (n=27)*: Young people who had engaged in any of the following from the MCVI tool: i) kicking, biting, choking, ii) hitting, punching someone, iii) trying to physically force someone to have sex against their will, iv) threatening someone with a knife, gun or other weapon, v) using a weapon on someone, vi) hurting someone so badly they required hospital treatment, vii) any other violent act towards another person. Or;

   young people who had engaged in any of the following items from DSM IV CD: i) fighting, ii) weapon use, iii) aggressive stealing, iv) forced sex, v) animal cruelty, vi) physically cruel.

3. *Co-occurring cases (n=59):* Young people who met criteria for both psychosis and aggression.

As outlined above, there were discrepancies between the medical notes and the research interview diagnoses on the presence/absence of psychosis in 17 cases. The majority of these cases (n=16) fell into the co-occurring category, while one was in the psychosis-only group. Key analyses were repeated excluding these cases to ensure that they had not unduly influenced the pattern of the findings. The Ns for these supplementary analyses were: psychosis-only (n=19), aggressive-only (n=27), co-occurring cases (n=43).

4.2.7 Statistical Analysis

All analyses were carried out using STATA version 11 (StataCorp 2009). Odds ratios and 95% confidence intervals were calculated from multinomial logistic regression models and are reported for the following group contrasts: co-occurring *versus* psychosis-only and co-occurring *versus* aggressive-only for the whole sample. Additional analyses were then carried out within unit type (co-occurring *versus* psychosis-only) and across unit type (GAU vs. MSU) for co-occurring cases specifically. Results from Mann-Whitney/chi-square tests for categorical data and t-tests for continuous data are provided for group contrasts where appropriate. For all tests the significance level was set at 5%.

<u>Power</u>

Power calculations were undertaken in STATA to assess the power of the design to detect differences between co-occurring cases and 'pure' groups on categorical and

continuous indicators of demographic factors, clinical features and psychosocial risks. Given the sample size in each group, the table below shows the rates of risk factor exposure needed in the co-occurring group to detect significant differences (increases) from each 'pure' group with 80% power with an alpha level of p=0.05, at selected levels of risk in each 'pure' group (5%, 10%, 20%, 30%). Although the figures suggest the final sample should have adequate power to detect clinically and/or theoretically meaningful group differences, as sample sizes are modest power calculations need to be treated with some caution.

Table 4.5: Power calculations: Pure groups vs. co-occurring cases

Psychosis-only vs. Co-occurring		**Aggression-only vs. Co-occurring**	
Psychosis only (n=20)	**Co-occurring (n=59)**	**Aggression only (n=27)**	**Co-occurring (n=59)**
Assumed risk exposure	*Minimum risk exposure to detect difference*	*Assumed risk exposure*	*Minimum risk exposure to detect difference*
5%	13%	5%	17%
10%	43%	10%	39%
20%	57%	20%	53%
30%	68%	30%	64%

Chapter 5

Inpatient Study - Results & Discussion

5.1 Results

5.1.1 Sample characteristics

Socio-demographic and clinical characteristics of the total sample, and separately for young people in general adolescent units (GAU) and medium secure units (MSU), are presented in Table 5.1. Overall there were more males than females in the sample, and participants were aged between 16 and 19 years old, with a mean age of 17.3 years (S.D. = 0.82). Young people who were white British accounted for just over half the sample (n=59, 55.6%) and were significantly more likely to be residing in MSUs than GAUs.

Not unexpectedly, the majority of the young people in the MSUs were referred from the criminal justice system. Examining research diagnoses, rates of psychosis and emotional disorders were elevated in the GAUs compared to the MSUs (but not significantly), whereas behavioural and alcohol dependence/abuse disorders were significantly more likely to be found in MSUs than GAUs. There were no differences in research diagnoses of drug dependence/abuse across the two unit types. The majority of young people had complex problems with more than 40% in both unit types meeting research criteria for four or more diagnoses.

Table 5.1: Sample description by unit type – general adolescent vs. medium secure and the total sample

	GAU[1] (n=53)		**MSU[1] (n=53)**		**Total Sample (n=106)**	
	(%)	**N**	**(%)**	**N**	**(%)**	**N**
Gender						
Male	53.0	28	70.0	37	61.3	65
Female	47.0	25	30.0	16	38.7	41
Age - years, **mean (S.D.)**	17.2 (0.8)	53	17.3 (0.9)	53	17.3 (0.8)	106
Ethnicity						
White	35.8	19	81.1	43	58.5	62
Non-white	64.2	34	18.9***	10	41.5	44
Mode of Referral						
Non-criminal	90.6	48	20.8	11	55.7	59
Criminal	9.4	5	79.2***	42	44.3	47
Research Diagnoses[2]						
Psychotic Disorder *(current episode)*	67.9	36	54.7	29	61.3	65
Depression *(current episode)*	42.8	21	36.7	18	39.8	39
Bipolar Disorder *(current episode)*	7.6	4	1.9	1	4.8	5
ODD *(ever)*	39.6	21	68.0**	36	53.8	57
CD *(ever)*	37.7	20	79.2***	42	58.5	62
Alcohol dependence / abuse *(ever)*	23.5	12	44.2*	23	34.0	35
Drug dependence / abuse *(ever)*	40.0	20	52.0	25	45.9	45
No of Research Diagnoses[3]						
1	6.2	3	2.1	1	4.2	4
2	22.9	11	14.6	7	18.7	18
3	22.9	11	39.6	19	31.2	30
4	35.4	17	22.9	11	29.2	28
5	10.4	5	14.6	7	12.5	12
6	2.1	1	6.2	3	4.2	4

[1] GAU = general adolescent unit, MSU = medium secure unit [2] % adds up to more than 100 due to young people having more than one diagnosis

[3] Research diagnoses could not be allocated to 10 cases and medical notes were used as supplements *p < 0.05 ** p < 0.01 *** p < 0.001

5.1.2 Bivariate analyses of risk factors and correlates of the co-occurring group compared to psychosis-only and aggression-only groups

Child and family characteristics

Table 5.2 provides information on child and family characteristics. Focusing first on the co-occurring vs. psychosis-only comparisons, there were no significant differences between the two groups in terms of sex ratios and age, but co-occurring cases were significantly less likely to be from a non-white background than young people in the psychosis-only group. As in study one, compared to the psychosis-only group, co-occurring cases were significantly more likely to be living in a non-family setting. No differences were found across the two groups with regards to developmental impairment. Although not significant, co-occurring cases had elevated rates of special education/behavioural and emotional educational needs, and were eight times more likely than the psychosis-only group to have been suspended or excluded from school altogether.

Turning to the co-occurring vs. aggressive-only contrasts, there were no significant differences between the two groups on any of these domains; however young people in the aggressive-only group were more likely to have higher rates of living in a non-family setting, higher rates of developmental impairments and increased rates of special education/behavioural and emotional educational needs. Rates of school suspension/exclusion were slightly lower for the aggressive-only group compared to the co-occurring group, but not significantly so.

Table 5.2: Child & Family Demographics

	Psychosis Only (**N=20**) (%)	**Co-occurring** (**N=59**) (%)	**Aggressive Only** (**N=27**) (%)	**Co-occurring vs. Psychosis** **Odds Ratio (95% CI)**	**Co-occurring vs. Aggressive** **Odds Ratio (95% CI)**
Gender					
Male	50.0	68.0	55.6	--	--
Female	50.0	32.0	44.4	0.47 (0.17 - 1.33)	0.59 (.23 - 1.51)
Age - Years, Mean (SD)	17.2 (0.7)	17.3 (0.9)	17.3 (0.8)	1.09 (0.62 - 1.94)	1.01 (0.59 - 1.73)
Ethnicity					
White	35.0	64.4	63.0	--	--
Non-white	65.0	35.6	37.0	0.30 (0.10 - 0.86)*	0.94 (0.36 - 2.42)
Family situation					
Living with family members	90.0	64.4	55.6	--	--
Living without family members	10.0	35.6	44.4	5.34 (1.10 - 25.9)*	0.71 (0.28 - 1.80)
Developmental Impairment	11.1	16.7	29.1	1.30 (0.24, 7.27)	0.35 (0.09 - 1.25)
Educational Status					
Not at school/dropped out‡	15.0	18.6	18.5	--	--
Regular school/college	80.0	62.7	44.4	0.68 (0.16 - 2.87)	1.41 (0.39 - 5.03)
SEN / Behavioural and Emotional difficulties school	5.0	18.6	37.0	2.96 (0.26 - 33.5)	0.37 (0.08 - 1.58)
School Suspension/Expulsion	30.0	79.7	70.4	8.73 (2.74 - 27.8)***	1.45 (0.49 - 4.32)

‡taken as reference *p < 0.05 ** p < 0.01 *** p < 0.001

Service contact and medication compliance

Table 5.3 shows indicators of service contact and medication compliance in the three study groups. Compared to the psychosis-only cases, those with both aggression and psychosis were significantly more likely to reside in medium secure units and to be treated compulsorily. There was no difference between the two groups in terms of whether or not they resided in an NHS or a private unit. While not significant, rates of referral via the criminal justice system (i.e. police, prison or courts) were higher for young people in the co-occurring group than the psychosis-only cases. In contrast (although again not significant), rates for the co-occurring group were lower than those in the aggressive-only group on all these indicators.

Rates were high for all three groups in terms of past contact with mental health services and there were few differences between them. Individuals in the aggressive-only group were younger at first contact with outpatient services and patients with psychosis only had higher rates of inpatient stays; co-occurring cases tended to fall between the other groups on these indicators. Compared to both pure groups, where rates of medication compliance were high (approaching 90% or above), the co-occurring cases were significantly less likely to be compliant with medication.

Table 5.3: Service contact and medication compliance

	Psychosis Only (N=20) (%)	**Co-occurring (N=59)** (%)	**Aggressive Only (N=27)** (%)	**Co-occurring vs. Psychosis Odds Ratio (95% CI)**	**Co-occurring vs. Aggressive Odds Ratio (95% CI)**
Sector					
NHS	45.0	55.9	33.3	--	--
Independent	55.0	44.1	66.7	0.75 (0.26 - 2.15)	0.42 (0.16 - 1.13)
Type of Unit					
GAU	85.0	45.8	33.3	--	--
MSU	15.0	54.2	66.7	6.57 (1.69-25.6)***	0.55 (0.21 - 1.45)
Mode of Referral					
Non-Criminal Justice	80.0	54.2	40.7	--	--
Criminal Justice	20.0	45.8	59.3	2.97 (0.84 - 10.5)	0.49 (0.18 - 1.29)
MHA Status					
Informal	60.0	30.5	22.2	--	--
Compulsory Detention	40.0	69.5	77.8	3.43 (1.16 - 10.2)*	0.62 (0.21 - 1.82)
Previous Contact with Services					
Outpatient	75.0	88.1	88.9	2.63 (0.70 - 9.83)	0.96 (0.23 - 4.09)
Mean Age	15.1 (1.7)	13.3 (3.4)	12.0 (4.2)	0.83 (0.62 - 1.12)	1.16 (0.99 - 1.35)
Inpatient	75.0	64.4	63.0	0.64 (0.19 - 2.10)	1.17 (0.44 - 3.07)
Mean Age	16.2 (0.8)	15.8 (1.1)	16.1 (1.5)	0.72 (0.36 -1.44)	0.88 (0.51 - 1.53)
Medication Compliance	89.5	61.4	95.6	0.19 (0.04 - 0.91)*	0.07 (0.01 - 0.60)**

*p < 0.05 ** p < 0.01 *** p < 0.001

Antisocial behaviour

Table 5.4 provides details on non-aggressive antisocial behaviours and behavioural histories. Consistent with findings from study one, as well as being physically aggressive, the co-occurring group were significantly more likely to show evidence of both oppositionality and non-aggressive antisocial behaviours compared to the psychosis-only group. Co-occurring cases were also significantly more likely to have a history of violent offending and to abuse alcohol and drugs.

When examining co-occurring and aggressive-only cases, both groups presented with similar rates on all oppositional and non-aggressive antisocial behaviours. Although not significantly different, rates for past offending were somewhat elevated for the co-occurring group. There were no differences between the two groups in terms of alcohol or drug abuse, or in age at onset of CD symptoms. Young people in the co-occurring group were, however, significantly more likely to have a longer duration of aggressive behaviour (>3 years) than those with aggression only.

With regard to callous and unemotional traits, whilst no differences were found across the three groups on the uncaring subscale, young people in the co-occurring group were significantly more likely to report higher callous trait scores than those in the psychosis-only group (and not differ from the aggressive-only group). Compared to both pure groups, young people in the co-occurring group reported significantly increased total ICU and unemotional subscale scores.

Table 5.4: Other antisocial behaviours and behaviour history

	Psychosis Only (N=20) *(mean, SD)*	**Co-occurring (N=59)** *(mean, SD)*	**Aggressive Only (N=27)** *(mean, SD)*	**Co-occurring vs. Psychosis** **Odds Ratio (95% CI) / Mann–Whitney / χ^2**	**Co-occurring vs. Aggressive** **Odds Ratio (95% CI) Mann–Whitney / χ^2**
Non-aggressive antisocial behaviour					
Oppositional behaviour	0.9 (1.5)	4.8 (2.2)	5.6 (1.8)	25.4 (7.20 - 89.4)***	0.59 (0.26 - 1.33)
Non-aggressive CD behaviours	0.4 (0.8)	4.1 (2.5)	4.1 (2.5)	3.41 (1.66 - 6.97)***	1.11 (0.49 - 2.54)
DSM IV - destruction of property	0.1 (0.3)	1.0 (0.8)	1.0 (0.7)	23.50 (4.06 - 136.5)***	1.11 (0.45 - 2.73)
DSM IV - deceitfulness or theft	0.2 (0.4)	1.4 (1.0)	1.1 (0.9)	9.98 (2.63 - 37.9)***	2.02 (0.84 - 4.81)
DSM IV - serious violation of rules	0.1 (0.5)	1.3 (1.0)	1.7 (1.1)	20.90 (4.11 - 105.8)***	0.61 (0.26 - 1.43)
Forensic History / Past offending *(%)*	10.0	62.7	59.3	11.9 (1.83 - 77.0)**	2.43 (0.47 - 12.5)
ICU Score[4]					
Total	21.7 (8.2)	28.9 (11.0)	23.9 (9.1)	3.91 (1.43 - 10.7)**	2.67 (1.16 - 6.14)*
Callous	4.7 (3.2)	9.6 (5.8)	8.3 (5.7)	6.69 (2.31 - 19.3)***	1.86 (0.81 - 4.24)
Uncaring	10.3 (4.5)	10.9 (5.6)	9.1 (4.6)	1.17 (0.46 - 2.95)	1.98 (0.87 - 4.50)
Unemotional	6.7 (3.4)	8.4 (3.2)	6.5 (2.9)	2.89 (1.06 - 7.83)*	2.60 (1.13 - 5.99)*
Substance abuse *(%)*					
Alcohol	10.0	45.8	51.8	7.89 (1.64 - 38.0)**	0.91 (0.35 - 2.39)
Drugs	30.0	62.1	59.2	3.50 (1.08 - 11.4)*	1.02 (0.36 - 2.86)
Duration of Physical Aggression					
No aggression	100.0	0.0	0.0	N/A	--
<=1 year‡	0.0	25.4	14.8	N/A	--
> 1 year & <=3 years	0.0	11.9	33.3	N/A	--
> 3 years	0.0	62.7	51.9	N/A	$\chi^2(2) = 5.9$ p=0.05
Onset of Conduct Disorder					
No CD	100.0	28.8	25.9	N/A	
Child onset CD symptoms	0.0	25.4	33.3	N/A	
Adolescent onset CD symptoms	0.0	45.8	40.7	N/A	$\chi^2(2) = 0.58$ p=0.75

[4] ICU=Inventory of Callous and Unemotional Traits ‡taken as reference *p < 0.05 ** p < 0.01 *** p < 0.001

Other comorbid symptoms and illness history

Table 5.5 examines other comorbid symptoms and illness history**.** Co-occurring cases resembled the psychosis-only group in terms of emotional symptoms. In addition, symptoms of mania and PTSD were significantly elevated in those with both aggression and psychosis compared to those with psychosis only. In addition, the co-occurring cases were five times more likely to have threat control override (TCO) symptoms (defined as 'delusions others can read their mind' and 'delusions of reference') than the psychosis-only group. Further analyses were carried out to examine whether or not co-occurring cases were a heterogeneous group with those with a long history of aggression comprising one sub-sample and those displaying TCO symptoms another sub-sample; no differences were found between co-occurring and aggressive-only cases, with young people in the co-occurring group displaying both TCO symptoms as well as long histories of aggressive behaviour (>3 years) - $\chi^2(2) = 1.34$ p=0.51. The co-occurring group were also significantly more likely to have a longstanding history of psychosis (>=1 year) as well as a longstanding history of any disorder compared to the psychosis-only group.

By comparison with the aggressive-only group, co-occurring cases did not differ on any of the current comorbid emotional symptoms. In this sample (and unlike study one), there were similarities across all three groups in terms of emotional symptoms with young people in aggressive-only reporting relatively high levels of depression and anxiety symptoms comparable to co-occurring and psychosis-only groups. When examining symptoms reported in past episodes, overall there were few differences, but young people in the co-occurring group were significantly less likely to report depression and mania symptoms. Not unexpectedly, rates for all current psychotic

symptom subscales (hallucinations, delusions & TCO symptoms) were significantly higher for the co-occurring group than the aggressive-only group. Although not significant, aggressive-only cases were more likely to have long-standing histories of any disorder compared to the co-occurring group.

Table 5.5: Other comorbid symptoms and illness duration

	Psychosis Only (N=20) *(mean, SD)*	**Co-occurring (N=59)** *(mean, SD)*	**Aggressive Only (N=27)** *(mean, SD)*	**Co-occurring vs. Psychosis Odds Ratio (95% CI)**	**Co-occurring vs. Aggressive Odds Ratio (95% CI)**
Depression symptoms - current	4.7 (5.9)	6.2 (6.4)	6.8 (5.6)	2.51 (0.85 - 7.47)	0.95 (0.38 - 2.32)
Depression symptoms - past	1.7 (4.1)	2.9 (5.1)	5.6 (6.2)	1.91 (0.56 - 6.58)	0.37 (0.14 - 0.96)*
Mania symptoms - current	1.1 (2.7)	1.8 (3.4)	1.6 (3.3)	3.84 (1.08 - 13.6)*	1.57 (0.59 - 4.11)
Mania symptoms - past	0.4 (1.3)	0.5 (2.0)	1.8 (3.6)	1.46 (0.26 - 8.14)	0.29 (0.09 - 0.92)*
Panic attack symptoms – current	1.5 (0.8)	1.5 (0.7)	1.4 (0.7)	1.23 (0.42 - 3.57)	1.56 (0.57 - 4.24)
Panic attack symptoms – past	1.2 (0.6)	1.3 (0.6)	1.5 (0.8)	1.46 (0.36 - 5.86)	0.60 (0.21 - 1.69)
Social phobia symptoms – current	1.7 (0.7)	1.4 (0.7)	1.6 (0.8)	0.48 (0.18 - 1.32)	0.76 (0.29 - 2.01)
Social phobia symptoms – past	1.0 (0.2)	1.0 (0.2)	1.2 (0.6)	0.73 (0.07 - 7.88)	0.33 (0.06 - 1.84)
Anxiety symptoms – current	4.7 (1.7)	4.8 (1.9)	4.8 (1.8)	1.07 (0.42 - 2.72)	1.11 (0.48 - 2.55)
Anxiety symptoms – past	3.4 (1.0)	3.4 (0.9)	3.5 (1.6)	0.92 (0.21 - 4.04)	1.18 (0.31 - 4.42)
PTSD symptoms – current[5]	1.6 (1.5)	2.5 (1.7)	3.4 (2.1)	3.06 (1.18 - 7.95)*	0.48 (0.20 - 1.11)
All psychotic symptoms - current	6.2 (5.3)	7.6 (5.0)	0.9 (1.7)	2.25 (0.83 - 6.11)	47.6 (13.9 - 162.9)***
All psychotic symptoms - past	2.0 (2.1)	0.5 (0.9)	1.8 (2.4)	0.75 (0.21 – 2.61)	0.26 (0.04 - 1.57)
Hallucinations - current	3.7 (3.0)	4.0 (3.1)	0.5 (1.0)	1.34 (0.50 - 3.58)	17.7 (5.71 - 54.9)***
Hallucinations - past	0.5 (1.4)	0.2 (0.7)	0.4 (0.9)	0.69 (0.12 - 4.02)	0.67 (0.17 - 2.67)
Delusions - current	2.7 (2.9)	3.7 (2.8)	0.4 (0.8)	2.27 (0.88 - 5.89)	28.1 (9.09 - 87.1)***
Delusions - past	0.4 (0.8)	0.2 (0.4)	0.8 (1.3)	0.62 (0.17 - 2.19)	0.36 (0.05 - 2.56)
TCO symptoms[6] – current (%)	25.0	66.1	7.4	5.70 (1.73 -18.7)***	34.7 (6.54 - 184.3)***
Duration of psychosis (%)					
<12 months	80.0	52.5	0.0	--	--
>= 1 year	20.0	47.5	0.0	3.82 (1.12 - 13.1)*	--
Duration of any disorder (%)					
<12 months	75.0	40.7	29.6	--	--
>= 1 year	25.0	59.3	70.4	4.23 (1.34 - 13.3)**	0.58 (0.22 - 1.57)

[5] Exposure to a traumatic event

[6] TCO= threat/control over-ride symptoms defined here as 'mind reading' and 'delusions of reference ' *p < 0.05 ** p < 0.01 *** p < 0.001

Family history & psychosocial adversity

Table 5.6 describes family histories and psychosocial adversities. Compared to the psychosis-only group, the co-occurring cases were significantly more likely to have aggression/violence present in their family as well as notably increased levels of contact with social services. Rates of mental disorder in the family and exposure to bullying were lower for the co-occurring group, but not significantly so. Young people in the co-occurring group were considerably more likely to have been victims of maltreatment and aggressive behaviour by others in the last year, compared to those in the psychosis-only group.

In comparison with the aggressive-only cases, the rates of all these factors were somewhat lower for the co-occurring group, but only differed significantly in terms of violence in the family.

Table 5.6: Family history & psychosocial adversity

	Psychosis Only (**N=20**) (%)	**Co-occurring** (**N=59**) (%)	**Aggressive Only** (**N=27**) (%)	**Co-occurring vs. Psychosis** **Odds Ratio (95% CI)**	**Co-occurring vs. Aggressive** **Odds Ratio (95% CI)**
Mental disorder present in other family members	65.0	58.6	55.6	0.87 (0.29 - 2.58)	1.17 (0.46 - 3.00)
Aggression / Violence present in other family members	10.0	44.1	66.7	6.88 (1.43 - 33.2)**	0.35 (0.13 - 0.94)*
Social services contact	10.0	58.6	70.0	9.25 (1.84 - 46.6)*	0.80 (0.31 - 2.06)
Maltreatment	35.0	59.3	70.4	3.55 (1.14 - 11.1)*	0.68 (0.25 - 1.85)
Bullied	55.0	42.4	59.3	0.66 (0.23 - 1.90)	0.52 (0.20 - 1.33)
Victim of aggressive behaviour (in the last year) *(mean, SD)*	0.5 (1.0)	1.5 (1.8)	2.2 (1.9)	3.37 (1.15 - 9.82)*	0.44 (0.20 - 1.01)

*p < 0.05 ** p < 0.01 *** p < 0.001

Excluding cases with discrepancies between research interview and medical record diagnoses

As noted in chapter four, in 17 cases there were discrepancies between the interview data and the medical notes in assignment of diagnoses of psychosis; 16 of these cases were in the co-occurring group, and one in the psychosis-only group. To ensure that these cases had not unduly influenced the pattern of the findings, all analyses were repeated excluding these cases. In general, group comparisons excluding the discrepant cases produced closely similar findings to those for the full original groups. Similar patterns of group differences were found, for example, for mean scores on indicators of **oppositionality** (*co-occurring* – mean 4.9, SD 2.0, *psychosis-only* - mean 0.8, SD 1.4, *aggressive-only* – mean 5.6 SD 1.8), **non-aggressive antisocial behaviour** (*co-occurring* – mean 4.3, SD 2.4, *psychosis-only* - mean 0.5, SD 0.8, *aggressive-only* – mean 4.1 SD 2.5), **current psychotic symptoms** (*co-occurring* – mean 8.1, SD 4.9, *psychosis-only* - mean 6.4, SD 5.4, *aggressive-only* – mean 0.9 SD 1.7), and **symptoms of PTSD** (*co-occurring* – mean 2.4, SD 1.7, *psychosis-only* - mean 1.4, SD 1.4, *aggressive-only* – mean 3.4 SD 2.1). Further, similar proportions were found on markers of **maltreatment** (*co-occurring* – 53.5%, *psychosis-only* – 31.6%, *aggressive-only* – 70.4%), **family mental illness** (*co-occurring* – 57.1%, *psychosis-only* – 63.2%, *aggressive-only* – 55.6%), **family violence** (*co-occurring* – 44.2%, *psychosis-only* - 10.5%, *aggressive-only* – 66.7%), and **forensic history** (*co-occurring* – 67.4%, *psychosis-only* – 10.5%, *aggressive-only* – 59.3%).

Overall, the pattern of group comparisons was similar to that found in the full sample on all 30 continuous indicators, and on 23 of the 25 categorical measures. Results for only two indicators differed: gender and duration of psychosis. Excluding the

discrepant cases, gender differences were found between co-occurring and psychosis-only cases - χ^2 (1)=5.2 p=0.02 with co-occurring cases now including more boys (n=33, 77%) than girls (n=10, 23%), suggesting discrepant cases related mainly to females. In addition, differences between co-occurring and psychosis-only cases on *duration of psychosis* were less marked and no longer significant -χ^2 (1)=0.8 p=0.36.

Exploring the effects of unit type: (i) Contrasts of co-occurring cases across unit types (GAU vs. MSU), and (ii) Group contrasts within unit type (GAU & MSU)

All analyses carried out so far in the full sample were independent of unit type. As outlined earlier, however, general adolescent units and medium secure units tend to admit somewhat differing populations of young people and it was therefore important to ensure the findings were not simply attributable to variations associated with unit type. To assess this, two additional sets of analyses were undertaken. First, to investigate if unit type affected the profile of the co-occurring group, analyses were carried out separately by general adolescent and medium secure units. Second, to ensure that group contrasts were not simply a function of unit type variations, two options were considered (i) including unit type as a covariate in the analyses, or (ii) repeating the analyses separately for young people in general and medium secure units. As there were only three psychosis-only cases in the medium secure units the first approach was not feasible; therefore the second approach was undertaken, focusing solely on young people in GAUs.

Contrasts of co-occurring cases across unit types – MSU vs. GAU (Tables 5.9 to 5.13)

Power calculations for these analyses (Table 5.7) suggested there was adequate power to detect group differences that are likely to be of clinical and/or theoretical significance. Again, however, power calculations should be treated with caution as sample sizes are modest.

Table 5.7: Power calculation: Co-occurring cases across unit type

Co-occurring Cases by Unit Type (General Adolescent & Medium Secure)	
GAU (n=32)	**MSU (n=27)**
Assumed risk exposure	*Minimum risk exposure to detect difference*
5%	13%
10%	45%
20%	58%
30%	69%

Tables 5.8 – 5.12 show details of analyses comparing co-occurring cases across unit types. Overall these results suggest that compared to the co-occurring cases in the GAUs, those in the MSUs were significantly more likely to engage in non-aggressive (as well as physically aggressive) behaviours; have a history of offending; be significantly more likely to have childhood and adolescent onset of CD symptoms; have elevated rates of alcohol abuse; and be more likely to have aggression/violence present in other family members. In addition, co-occurring cases in the MSUs had significantly elevated rates of concurrent delusional symptoms and were also more likely than their GAU counterparts to have long histories of psychosis as well as of any disorder. Indeed across most domains, co-occurring cases in the MSUs tended to have higher rates of difficulty than those in the GAUs.

Table 5.8: *Co-occurring cases by unit type* - child & family demographics

	Co-occurring Cases		**Odds Ratio 95% CI**
	MSU (N=32) *(%)*	***GAU (N=27)*** *(%)*	
Sex - Male	66.7	68.7	1.51 (0.58 - 3.88)
Age - Years, Mean (SD)	17.4 (0.9)	17.1 (1.0)	1.41 (0.80 – 2.47)
Ethnicity			
White	81.2	44.4	--
Non-white	18.8	55.6	0.17 (0.05 - 0.57)**
Family situation			
Living with family members	46.9	85.2	--
Living without family members	53.1	14.8	7.51 (1.97 - 28.6)***
Developmental Impairment	26.1	8.0	3.76 (0.66 - 21.5)
School Suspension/Expulsion	94.0	52.8	22.8 (2.53 - 204.9)**

*p < 0.05 ** p < 0.01 *** p < 0.001

Table 5.9: *Co-occurring cases by unit type* - service contact and medication compliance

	Co-occurring Cases		**Odds Ratio 95% CI**
	MSU (N=32) (%)	***GAU (N=27) (%)***	
Sector			
NHS	46.9	66.7	--
Independent	53.1	33.3	2.52 (0.81 - 7.82)
Mode of Referral			
Non-Criminal Justice	25.0	88.9	--
Criminal Justice	75.0	11.1	42.2 (7.24 - 245.7)***
Previous Contact with Mental Health Services			
Outpatient	90.6	85.2	1.53 (0.25 - 9.12)
Mean Age	12.6 (3.8)	14.2 (2.7)	0.33 (0.10 - 1.04)
Inpatient	65.6	63.0	1.11 (0.37 - 3.32)
Mean Age	15.7 (1.2)	16.1 (1.1)	0.58 (0.16 - 2.11)
Medication Compliance	54.8	69.2	0.57 (0.19 - 1.76)

*p < 0.05 ** p < 0.01 *** p < 0.001

Table 5.10: *Co-occurring cases by unit type* - other antisocial behaviours

	Co-occurring Cases		**Odds Ratio 95% CI / χ^2**
	MSU (N=32)	***GAU (N=27)***	
Non-aggressive antisocial behaviour *(mean, SD)*			
Oppositional behaviour	5.4 (1.8)	4.2 (2.4)	2.30 (0.88 - 6.03)
Non-aggressive CD behaviours	5.3 (2.0)	2.6 (2.2)	8.43 (2.89 - 24.6)***
DSM - destruction of property	1.3 (0.6)	0.7 (0.8)	5.26 (1.76 - 15.7)**
DSM - deceitfulness or theft	1.8 (0.8)	0.9 (1.0)	2.08 (2.08 - 17.1)
DSM - serious violation of rules	1.7 (1.0)	0.8 (0.9)	5.53 (1.92 - 15.9)**
Forensic History / Past offending *(%)*	90.6	29.6	25.4 (5.33 - 121.1)***
ICU Score: self-report *(mean, SD)*			
Total	30.3 (11.0)	27.3 (11.1)	1.76 (0.69 - 4.50)
Callous	10.5 (6.1)	8.6 (5.3)	2.01 (0.78 - 5.14)
Uncaring	12.0 (5.4)	9.8 (5.7)	2.29 (0.87 - 6.01)
Unemotional	7.8 (2.9)	9.0 (3.5)	0.57 (0.22 - 1.48)
Substance abuse *(%)*			
Alcohol	62.5	25.9	4.49 (1.45 - 13.9)**
Drugs	71.9	50.0	3.08 (0.80 - 11.9)
Duration of Physical Aggression			
No aggression	0.0	0.0	--
<=1 year‡	3.1	51.8	--
> 1 year & <=3 years	3.1	22.2	--
> 3 years	93.8	25.9	$\chi^2(2) = 28.9$ p<0.001
Onset of Conduct Disorder			
No CD	9.4	51.8	--
Child onset CD symptoms	37.5	11.1	19.7 (3.27 - 118.2)***
Adolescent onset CD symptoms	53.1	37.0	7.78 (1.76 - 34.3)**

‡ taken as reference *p < 0.05 ** p < 0.01 *** p < 0.001

Table 5.11: *Co-occurring cases by unit type* - other comorbid symptoms and illness duration

	Co-occurring Cases		**Odds Ratio 95% CI**
	MSU *(**N=32**)* *(mean, SD)*	***GAU*** *(**N=27**)* *(mean, SD)*	
Depressive symptoms - current	5.6 (6.6)	6.8 (6.3)	0.97 (0.35 - 2.65)
Depressive symptoms - past	3.1 (4.6)	2.7 (5.4)	1.55 (0.50 - 4.74)
Mania symptoms - current	1.3 (2.2)	2.2 (4.3)	2.01 (0.70 - 5.70)
Mania symptoms - past	0.2 (0.6)	0.8 (2.8)	1.14 (0.22 - 5.82)
Panic attack symptoms – current	1.3 (0.6)	1.7 (0.8)	0.34 (0.11 - 1.06)
Panic attack symptoms – past	1.4 (0.7)	1.1 (0.4)	3.76 (0.89 - 15.8)
Social phobia symptoms – current	1.3 (0.6)	1.5 (0.7)	0.68 (0.21 - 2.16)
Social phobia symptoms – past	1.1 (0.2)	1.0 (0.2)	1.72 (0.14 - 20.6)
Anxiety symptoms – current	4.6 (1.9)	5.1 (1.8)	0.66 (0.25 - 1.69)
Anxiety symptoms – past	3.3 (0.8)	3.5 (1.0)	0.70 (0.17 - 2.89)
PTSD symptoms	2.8 (1.6)	2.2 (1.7)	1.81 (0.71 - 4.67)
Total psychotic symptoms - current	6.2 (4.2)	9.3 (5.5)	0.39 (0.14 - 1.07)
Total psychotic symptoms - past	0.7 (1.1)	0.3 (0.7)	2.25 (0.60 - 8.38)
Hallucinatory symptoms - current	3.5 (2.8)	4.4 (3.4)	0.73 (0.26 - 2.01)
Hallucinatory symptoms - past	0.4 (0.9)	0.1 (0.4)	4.91 (0.51 - 47.1)
Delusional symptoms - current	2.8 (2.3)	4.7 (3.0)	0.28 (0.10 - 0.74)**
Delusional symptoms - past	0.2 (0.4)	0.2 (0.4)	1.20 (.30 - 4.79)
TCO symptoms – current (%)	59.4	74.1	0.37 (0.11 - 1.29)
Duration of psychosis (%)			
<12 months	34.4	74.1	--
>= 1 year	65.6	25.9	6.14 (1.89 - 19.9)**
Duration of any disorder (%)			
<12 months	21.9	63.0	--
>= 1 year	78.1	37.0	6.35 (1.97 - 20.5)**

*p < 0.05 ** p < 0.01 *** p < 0.001

Table 5.12: *Co-occurring cases by unit type* - family history & psychosocial adversity

	Co-occurring Cases		**Odds Ratio 95% CI**
	MSU (N=32) *(%)*	***GAU (N=27)*** *(%)*	
Mental disorder present in other family members	71.0	44.4	2.98 (0.98 - 9.11)
Aggression / Violence present in other family members	59.4	25.9	5.54 (1.64 - 18.7)**
Social services contact	71.0	44.4	2.89 (0.96 - 8.65)
Maltreatment	68.7	48.1	2.94 (0.93 - 9.35)
Bullied	50.0	33.3	2.79 (0.85 - 9.14)
Victim of aggressive behaviour (in the last year) *(mean, SD)*	1.5 (1.9)	1.4 (1.7)	1.25 (0.47 - 3.31)

*p < 0.05 ** p < 0.01 *** p < 0.001

Group contrasts within unit type - GAU and MSU

As there were only three psychosis-only cases in the MSUs, power calculations were only feasible for psychosis-only vs. co-occurring comparisons in the GAUs. As can be seen in Table 5.7 sample sizes are once again modest and power calculations need to be interpreted cautiously, but there was adequate power to detect marked group differences.

Table 5.13: Power calculation: Psychosis-only vs. co-occurring in general adolescent units

Psychosis-only vs. Co-occurring in General Adolescent Units	
Psychosis only (n=27)	**Co-occurring (n=17)**
Assumed risk exposure	*Minimum risk exposure to detect difference*
5%	9%
10%	53%
20%	66%
30%	76%

Group differences found in the full sample were largely borne out within each type of setting, with only few exceptions**.** Certain previously statistically significant differences between the co-occurring and psychosis-only groups did not remain on the following correlates (ethnicity, parental status, forensic history, alcohol & drug abuse and current manic and PTSD symptoms), possibly due to limited power. In each case, however, rates remained elevated for the co-occurring group compared to the psychosis-only cases, consistent with analyses for the full sample. Similarly, although statistical tests were not feasible in the co-occurring vs. aggressive only contrasts, the pattern of findings (with respect to rates) was generally similar to that found in the full sample. Full details of these additional contrasts are provided in Tables 5.14 – 5.18, appendix 5.1.

5.2 Discussion

In this study 106 young people (aged on average 17 years old) recruited from 5 general adolescent units (GAUs) and 5 medium secure units (MSUs) across England were assessed. Overall sample characteristics suggested there were no differences between the young people in the two settings in terms of gender or age, but that those in the MSUs were significantly more likely to be from a white background. Young people in both settings presented with multifaceted problems with the majority meeting criteria for three (MSUs) and four (GAUs) research diagnoses.

As in study one the aims of this study were to compare three groups of young people - those with psychosis only, those with aggression only and those with both psychosis and co-occurring aggression - on a range of variables including socio-demographic background, behaviour, clinical characteristics and psychosocial risk factors. Building on study one, the current study enabled us to expand the earlier findings by examining additional features of antisocial behaviours (such as callous and unemotional traits), as well as additional features of psychosis such as threat control override (TCO) symptoms and duration of treated psychosis. Furthermore, in this study it was possible to investigate additional clinical symptoms of mania and PTSD as well as medication compliance and victimisation of the young person. It was hypothesised that co-occurring cases would be similar to aggressive-only cases (and differ from psychosis-only cases) with respect to callous and unemotional traits, non-aggressive antisocial behaviours and levels of victimisation. Further, co-occurring cases would have higher rates of TCO symptoms compared with psychosis-only cases.

Consistent with these hypotheses, co-occurring cases resembled the aggressive-only group (and differed from the psychosis-only cases) on levels of non-aggressive antisocial behaviours, victimisation and some aspects of callous and unemotional traits. Similarly, as predicted, compared to the psychosis-only group, co-occurring cases displayed higher levels of TCO symptoms. Further details for each group and their associated features are provided below.

5.2.1 Co-occurring cases in comparison with psychosis-only and aggression-only cases

Co-occurring cases did not differ from psychosis-only or aggressive-only cases on gender, age or developmental impairment. Overall, co-occurring cases were more similar to young people in the aggressive-only group; they were comparable to them (and differed from the psychosis-only group) with respect to living without family members, being suspended/expelled from school and ethnic background (non-white). Interestingly, findings on ethnicity differed from those in study one, where young people with psychosis only were more likely to be from a non-white background. Given our focus on psychosis, and the well-established increased risk of psychosis in ethnic minority groups (Fearon et al, 2006; Cantor-Graae & Selton, 2005), it was not surprising that there were high rates of ethnic minorities in our sample in general adolescent units; unexpectedly, however, the same pattern was not found in the medium secure units. Unfortunately, despite searching, no official statistics to indicate the ethnic mix of young people referred or admitted to adolescent psychiatric hospitals in the UK were found, so it was not possible to check the representativeness of our sample. There was no reason to suspect that the ethnic composition of our sample reflected any form of selection bias, however, and

therefore we suspect that the anomaly was most likely to be a function of the particular units from which most of the young people were recruited.

In line with findings in study one, and in marked contrast to the psychosis-only cases in the current study, co-occurring cases resembled young people in the aggressive-only group in terms of oppositionality and non-aggressive conduct problems as well as aggressive behaviour. A novel finding from the current study was that co-occurring cases also differed from the psychosis-only group (and were comparable to the aggressive-only cases) in terms of past histories of offending; high rates of callous traits; being placed in an MSU; and having past social services involvement. With more detailed information on substance abuse in this study (compared to study one), rates were found to be significantly lower for the psychosis-only cases than the co-occurring group, but there were no differences between the aggressive-only and co-occurring cases. It seems intuitively plausible that the finding about unit placement resulted from the caution amongst general units in admitting young people with histories of antisocial behaviour, substance abuse and violence or aggression. Although the aggressive-only and co-occurring groups were comparable in terms of CD onset, young people in the co-occurring group were significantly more likely to have longstanding histories of aggression (>3 years) than the aggressive-only group. Furthermore, once again the co-occurring cases resembled the aggressive-only group and differed significantly from the psychosis-only cases on markers of maltreatment and victimisation.

By contrast with study one; there were very few differences across all three groups with respect to emotional symptoms. Given that this was inpatient sample, it is possible that even young people in the aggressive-only group had elevated levels of symptoms of all kinds. Where there was any disparity, co-occurring cases were less

likely to report past symptoms of depression and mania compared to the aggressive-only group, and they did not differ from the psychosis-only cases in this respect; co-occurring cases were also more likely to have long standing histories of any disorder. Focusing on additional features of psychosis in the current study, young people in the co-occurring group did not differ from the aggressive-only cases, and were significantly more likely than the psychosis-only group, to have longstanding histories of psychosis and higher rates of concurrent mania and PTSD symptoms. Indeed, 104 young people out of the total of 106 reported at least one traumatic event, highlighting once again the severity and complexity of the issues facing the young people in this sample. Compared to both pure groups, co-occurring cases were significantly more likely to have high rates of TCO symptoms; were more likely to report higher total ICU scores as well as higher scores for the unemotional subscale; and were significantly less likely to be compliant with their medication. The risks associated with both non-compliance and TCO's may well have contributed to the greater level of detention under the Mental Health Act in this group.

To ensure the robustness of our findings, our analyses in the full sample were repeated for young people in each unit type. The pattern of the results remained essentially unchanged. In addition, comparisons of the co-occurring cases across unit types were made; like findings reported in an adult study (Hodgins et al. 2007), the results suggested that compared to co-occurring cases in the GAUs, young people in the MSUs had longstanding histories of non-aggressive behaviour; higher rates of past offending and alcohol abuse; were more likely to have family members displaying aggression; had longstanding histories of psychosis and other disorders, and elevated rates of concurrent delusional symptoms.

Many investigators in adult studies have found TCO symptoms to play an important role in the risk of aggression in samples with psychosis (Link et al. 1998; Hodgins et al. 2003), although findings are not entirely consistent (see e.g. Appelbaum et al. 2000; Milton et al. 2001). There is no consensus as to how TCO symptoms are best defined. Link and Stueve (1994) used the following symptoms: 1. your mind was dominated by forces beyond your control, 2. thoughts were put into your head that were not your own, and 3. there were people who wished to do you harm. Dean et al. (2007) defined TCO symptoms as delusions of persecution or control, and Milton et al. (2001) used the following symptoms: 1. disordered thought, 2. delusions of control, 3. bizarre delusions and interpretations, 4. miscellaneous delusions, 5. delusions of reference and 6. delusions of persecution. As a sample of adolescents with early onset psychosis were being studied here, lower level symptoms of 'mind reading' (other people can read my mind) and 'delusions of reference' (people say things with a double meaning) were chosen. Using this definition it was found that TCO symptoms were markedly elevated in the co-occurring group (where two thirds of young people reported symptoms of this kind) compared to the psychosis-only group, where only a quarter were affected. Although these findings were comparable to those of some adult studies, further exploration and replication are needed to assess how far this pattern is repeated in other samples, and robust to different definitions of TCO symptoms.

An interesting point of note that arose in the course of the data collection was the discrepancy in the ways that different units labelled young people who presented with apparently similar symptom profiles. For instance, a young person presenting with psychotic symptoms may have received a diagnosis of schizophrenia or psychosis in one unit, but as suffering from PTSD/a traumatic event in another, with their psychotic symptoms perceived to be pseudo-hallucinations rather than true

hallucinatory phenomena. As outlined earlier, there were 17 cases in the sample where psychotic symptoms reported by the young people during the research interviews were described in their medical records as either 1. pseudo-hallucinations (linked to trauma), 2. psychotic symptoms present but not considered severe enough (at that stage) to warrant a diagnosis, or 3. not mentioned at all. The research team discussed the phenomenology at length and concluded that there was no reason to doubt the reports given by the young people in the interviews. Three of the researchers conducting interviews were child and adolescent psychiatrists, and as such were not naïve to complex cases. In addition, it was rare for young people to deny psychotic symptoms reported in the medical notes. The discrepancies were unlikely to have been due to random classification errors, as they were predominantly found in one unit where the focus in terms of assessment and treatment tended to be on trauma and emerging personality disorder. As a result, it may simply be that the ethos of the unit leaned more towards linking psychotic symptoms to traumatic events and / or for referring services to select this unit for young people whose difficulties they considered best fitted this picture. Sixteen of the discrepant cases formed part of the co-occurring group and one was part of the psychosis-only group. For the current study, to explore how potential misclassification might have influenced the findings, analyses removing these discrepant cases were conducted and overall results were similar to those with the original analyses. The key differences were on indicators of duration of psychosis and gender; significant differences between co-occurring cases and psychosis-only cases no longer remained on the former but significant differences were observed with regards to gender, with males now outnumbering females in the co-occurring group, suggesting many of the discrepant cases were females.

5.2.2 Strengths and limitations of the study

This is the first study to carry out exploratory research in 10 adolescent inpatient samples investigating psychosis and aggression. Out of a total of seven medium secure units in the UK, five participated in the study. There was also high participation rate at the individual level, with only four young people declining the invitation to take part in the study. Symptoms were assessed via a standardised diagnostic tool by trained interviewers (three of whom were child and adolescent psychiatrists), with good to excellent inter-rater reliability. Validated tools were used to measure aggressive behaviour and callous and unemotional traits. In addition to the young people's reports, collateral information was obtained from their medical notes and key worker nurses. Together with these strengths, there were some methodological limitations. Recall bias may have been present as information on past episodes and exposures inevitably relied on retrospective reports; however, information from medical notes/staff was used in conjunction with interview data to minimise the impact of recall as much as possible. Although it was not feasible here, including parents/carers as additional informants would have been valuable and would be beneficial in future studies. However, given the loss of contact with the families experienced by young people in MSUs and the distance away from young people's homes in GAU's, the collection of data from parents would require significant time and resource and would need careful planning. Selection bias may have been present as the study relied on unit consultant psychiatrists to 'filter' patients and advise us of relevant cases in the latter stages of the study. However, the lead researcher was in regular contact with the units on a weekly basis to try to ensure that no patients meeting the inclusion criteria were missed, and where patients were too ill to participate initially they were followed up before discharge. Although the sample had adequate power to detect differences between the three

selected groups in the majority of the analyses, the Ns available precluded multivariate analyses which would have been a valuable approach to highlight key independent predictors of group differences. It was not possible in the this study to assess young people under the age of 16, but given that children as young as 12 are placed in both general and medium secure units, assessment in a younger age group would be important for future studies using adolescent inpatient samples. Referral factors may have introduced some potential bias, particularly regarding those young people referred for forensic assessment; replication in prison samples would thus be valuable. Finally, as this was a cross-sectional study, ordering of onset of psychosis and aggressive behaviour in the co-occurring cases cannot be determined.

Conclusion

Using inpatient samples, it was possible to identify diagnostically defined groups showing psychosis and co-occurring aggression in young people. Extending beyond the measures available in study one, the current study enabled examinations of callous and unemotional traits, threat control override (TCO) symptoms, additional clinical symptoms of mania and PTSD as well as medication compliance and victimisation of the young person. This was a sample with severe and complex difficulties, with young people on average having three diagnoses and 98% reporting at least one traumatic event in their lifetime. Compared to both pure groups, co-occurring cases were significantly more likely to have high rates of TCO symptoms; were more likely to report higher total ICU scores as well as higher scores for the unemotional subscale, and were significantly less likely to be compliant with their medication. In an effort to replicate findings within a community sample, the next chapter will move away from clinical samples and examine psychosis/aggression overlaps in young people using a longitudinal general population sample.

Chapter 6

Psychotic symptoms and aggression in a general population sample

6.1 Introduction

Having examined the association between psychosis and aggression in two clinical samples, the intention of the current study was to investigate if findings from the previous two studies could be replicated in a non-referred community sample. Samples of this kind have been previously used to examine the overlaps between psychosis and aggression. For example, using prospective data from the Dunedin longitudinal study, Kim-Cohen et al. (2003) reported 40% of individuals who developed schizophreniform disorders by age 26 had met diagnostic criteria for Conduct Disorder by age 15. Using the same sample, an elevated risk of violence among those developing schizophreniform disorders had also been found to be associated with both aggressive behaviours and psychotic symptoms much earlier in development (ages 7 to 11) (Arseneault et al. 2003). In addition, Brennan and colleagues (2002) utilised a Danish birth cohort and reported that men and women with schizophrenia were significantly more likely to have been arrested for criminal violence than were persons who had never been hospitalised, even after controlling for demographic factors, substance abuse, and personality disorders.

The studies outlined above took as their outcomes diagnostically-defined psychotic disorders in adulthood. Evidence now exists that psychotic symptoms assessed in childhood represent a developmental risk for adult schizophrenia and may thus provide an additional framework for investigating aetiological factors for later psychosis. Specifically, (Poulton et al. 2000) was able to show a strong linear relationship between self-reported psychotic symptoms in childhood and adult schizophreniform disorder using the Dunedin longitudinal general population sample. Furthermore, using data from the British longitudinal twin study (the E-Risk study) to be reported on here, Polanczyk et al. (2010) reported that children in the community self-reporting hallucinations and delusions at age 12 shared many of the same risk factors and correlates as adults with schizophrenia.

To build on these findings, psychotic symptoms and their association with aggressive behaviour in childhood were examined, in an effort to further understand the characteristics of individuals at risk for this developmental progression. These possibilities were explored using a British twin cohort of 2,232 children. This is a prospective longitudinal sample that has assessed psychotic symptoms and aggression at age 12, and includes repeated measures of aggression earlier in childhood (at ages 5, 7 & 10 years). Risk factors specific to psychosis and aggression, as well as a wide range of other potential risk factors and correlates have also been measured, enabling us to extend the range of predictors assessed in our previous clinical studies. As outlined above, existing studies using the E-Risk sample have shown strong associations between a general measure of antisocial behaviour (at ages 5 & 12 years) and psychotic symptoms at age 12 (Polanczyk et al. 2010).

6.1.1 Research question

Are the risk factors and correlates of co-occurring psychosis and aggression similar to or different from those for psychosis or aggression only?

6.1.2 Research hypotheses

The co-occurring group would have higher rates of unfavourable neurodevelopment markers; non-aggressive antisocial behaviours at all four ages; and exposure to adverse experiences including poor home environments, parental antisocial behaviour and maltreatment compared to the psychosis-only cases but would not differ from the aggressive-only cases.

6.1.3 Research aims and objectives

1. To examine the correlates and precursors of comorbid aggression and psychotic symptoms. Using four groups: (i) Psychotic symptoms only, (ii) Aggression only, (iii) Both psychotic symptoms and aggression, and (iv) neither (as a reference group); comparisons will be made regarding demographic factors, developmental impairments, other comorbid diagnoses and symptoms at age 12, other diagnoses and symptoms at ages 10, 7 & 5 as well as psychosocial risks including parental mental health problems, parental antisocial behaviour and maltreatment.

2. To assess independent predictors of aggression among children with psychotic symptoms and independent predictors of psychosis among children with aggression using multivariable analysis.

3. To assess independent predictors of co-occurring psychotic symptoms and aggression using multivariable analysis.

6.2 Method

6.2.1 Sample

Participants were members of the Environmental Risk (E-Risk) Study, which tracks the development of a birth cohort of 2,232 British children. The sample was drawn from a larger birth register of twins born in England and Wales in 1994-1995 (Trouton, Spinath & Plomin, 2002). The E-Risk sample was constructed in 1999-2000, when 1,116 families with same-sex 5-year-old twins (93% of those eligible) participated in home-visit assessments. Families were recruited to represent the UK population of families with newborns in the 1990's, based on (a) residential location throughout England and Wales and (b) mother's age (i.e., older mothers having twins via assisted reproduction were under-selected and teenage mothers with twins were over-selected). The investigators used this sampling (a) to replace high-risk families who were selectively lost to the register via non-response and (b) to ensure sufficient numbers of children growing up in high-risk environments. All research workers had university degrees in behavioural science, and experience in psychology, anthropology or nursing. Zygosity was determined using a standard zygosity

questionnaire, which has been shown to have 95% accuracy. Ambiguous cases were zygosity-typed using DNA. The sample included 54% monozygotic (MZ) and 46% dizygotic (DZ) twin pairs. For all twin pairs sex was evenly distributed within zygosity (49% male). Follow-up home visits were conducted when the children were aged 7 (98% response rate, N=2,191), aged 10 (96% response rate, N=2,143) and aged 12 (96% response rate, N=2,143). At each wave of assessment informed parental consent was obtained and for the age 12 interviews, the children's assent was also obtained. The E-Risk Study received ethical approval at each phase from The Joint South London and Maudsley and the Institute of Psychiatry Research Ethics Committee.

6.2.2 Measures

Psychotic symptoms

Children were assessed for psychotic symptoms at age 12 in a private interview with interviewers that had no prior knowledge of the child (different interviewers spoke with the child's parents). As shown in Table 6.1, seven psychotic symptoms were investigated. Item selection was based on prior work on psychotic symptoms undertaken in The Dunedin Longitudinal Study (Poulton et al, 2000) and the Avon Longitudinal Study of Parents and Children (Schreier et al, 2009). A conservative approach was taken to assigning a child's report as a symptom. The protocol consisted of 3 steps; firstly, when a child endorsed any symptom, the interviewer probed using standard prompts designed to discriminate between experiences that were plausibly real (e.g., "I was followed by a man after school") vs. potential symptoms (e.g., "I was followed by an angel who guards my spirit") and wrote down

the child's narrative description of the experience. Each experience was then coded as "not a symptom" (0), "probable symptom" (1), or "definite symptom" (2) by the interviewers on the basis of these responses. Secondly, a psychiatrist expert in schizophrenia, a psychologist expert in interviewing children, and a child and adolescent psychiatrist reviewed all the written narratives to confirm the interviewers' codes (but without consulting other data sources about the child or family). Thirdly, because this is a twin sample, experiences limited to the twin relationship (e.g., "My twin and I often know what each other are thinking") were coded as "not a symptom" (0).

Table 6.1 provides the frequency of psychotic symptoms which were coded as probable or definite. Hallucinations (both visual and auditory) were the most common symptoms, while mind reading was the least common. Psychotic symptoms were reported by 416/2127 children (19.6%); of those, 291 (13.7%) reported only probable symptoms and 125 (5.9%) reported at least 1 definite symptom. As previously reported (Polanczyk et al., 2010), children with at least 1 definite psychotic symptom often had multiple symptoms: 36 (28.8%) reported multiple definite symptoms and 76 (60.8%) also reported probable symptoms.

Table 6.1: Frequency of children's self-reported psychotic symptoms, coded as probable or definite symptoms* in the full sample (n=2127)

Psychotic symptoms investigated	**Probable N (%)**	**Definite N (%)**
Hallucinations		
Have you heard voices that other people cannot hear?	169 (7.9%)	90 (4.2%)
Have you ever seen something or someone that other people could not see?	168 (7.9%)	42 (2.0%)
Delusions		
Have you ever thought you were being followed or spied on?	54 (2.5%)	15 (.7%)
Have you ever felt like you were under the control of some special power?	41 (1.9%)	16 (.8%)
Have you ever known what another person was thinking, even though that person wasn't speaking, like read their mind?	14 (.7%)	5 (.2%)
Have you ever believed that you were sent special messages through television or radio?	26 (1.2%)	3 (.1%)
Have other people ever read your thoughts?	9 (.4%)	0

*Symptoms are not mutually exclusive.

Like previous reports using these measures (Polanczyk et al., 2010), a dichotomous variable differentiating children who reported no definite psychotic experiences (N=2,002, 94.1%) from those who reported at least one definite psychotic experience (N=125, 5.9%) was utilised.

Antisocial / aggressive behaviour

Measurement of children's behavioural problems was based on the Child Behaviour Checklist (CBCL) (Achenbach, 1991a) completed by mothers/main caretakers at ages 5, 7, 10 and 12 years. Mothers were given the instrument as a face-to-face interview and rated each item as being "not true" (0), "somewhat or sometimes true"

(1), or “very true or often true” (2). The reporting period was 6 months before the interview. The Achenbach instruments have strong and well-documented psychometric properties and have been extensively used in large epidemiological studies (Greenhill, Malcolm & Child, 2000).

Defining antisocial behaviour subscales

Although the CBCL includes an empirically derived subscale labelled *aggression,* inspection of the items included in this scale suggested that it included both aggressive items and items often classified as oppositional (e.g. ‘argues’, ‘disobedient’). As the primary interest in the current study was to assess associations between psychotic symptoms and aggression, factor analysis was used to derive more homogeneous subscales from the full pool of antisocial items.

Initially exploratory factor analysis was carried out with the antisocial items outlined in Table 6.2 at age 12. Using STATA version 11 (StataCorp. 2009), principal components factors analysis was conducted which generated five factors with an eigenvalue >1. Although analysis of the scree plot suggested only three factors needed to be retained, solutions for three, four, and five factors were also examined using varimax rotations. The five factor solution, which explained 53% of the variance, was preferred because forcing items into three or four factors produced insufficient numbers of primary loadings and there was difficulty interpreting the factors. The items listed in Table 6.2 loaded onto one factor described as *aggression* and a second factor we described as *oppositionality*. Item loadings for both factors were >.5. Only one item (*angry and hostile)* cross loaded >.4. Remaining items loaded across 3 factors. The same steps were repeated at ages 5, 7 and 10 and produced closely similar results.

Table 6.2: Factor loadings of antisocial behaviour items at age 12

Variable	Factor 1 (oppositionality)	Factor 2 (aggression)	Factor 3	Factor 4	Factor 5
Argues	0.7583				
Disobedient at home	0.7056				
Annoys people on purpose	0.6034				
Irritable	0.7576				
Blames others	0.6422				
Temper/temper tantrums	0.7655				
Angry & hostile	***0.4808***	***0.4478***			
Cruel or nasty to others		0.6360			
Bullying/threatening people		0.6294			
Gets in many fights		0.5701			
Physically attacks people		0.6598			
Spiteful		0.5889			
Hits with things that can hurt		0.6557			
Take something by force		0.6570			
Disobedient at school			0.5544		
Lying/cheating			0.5183		
Steals at home			0.6982		
Steals outside home			0.4719		
Stays out late			0.5763		
Destroys own things				0.5120	
Sets fires				0.7727	
Vandalism				0.5500	
Cruel to animals				0.4537	
Destroys others things				0.4924	
Truants					0.7186
Breaking & entering					0.7243
Runs away home					0.4083

To test the results, a confirmatory factor analysis was then conducted in Mplus (Muthén & Muthén, 1998-2011). A two factor model using the aggression and oppositionality factors derived from the exploratory factor analysis was examined. Taking into account the categorical nature of the data, a robust weighted least squares estimation (WLSMV) was used. Model fit was determined through Comparative Fit Index and Tucker-Lewis Index (CFI and TFI; acceptable fit ≥ .90) (Bentler & Bonnet, 1980) and root mean square error of approximation (RMSEA; acceptable fit ≤ .08) (Browne & Cudek, 1993). To test the *angry and hostile* item, it was entered into both models. Primary loadings were consistently higher for oppositionality (≥.6) than aggression (≤.45) at all ages. As a result the *angry and hostile* item was retained in oppositionality. The confirmatory factor analysis of oppositionality and aggression factors fit the data adequately for all ages: **age 5;** χ^2 (76) = 532.86, p < .001; CFI = .97, TLI = 97; RMSEA = .052. **Age 7;** χ^2 (76) = 526.57, p < .001; CFI = .98, TLI = 97; RMSEA = .052. **Age 10;** χ^2 (76) = 499.24, p < .001; CFI = .98, TLI = 98; RMSEA = .051. **Age 12;** χ^2 (75) = 514.33, p < .001; CFI = .98, TLI = 97; RMSEA = .052.

As shown in Table 6.2, items for non-aggressive conduct problems did not load onto a single factor. As a consequence, DSM IV criteria of Conduct Disorder (CD) (except for the physically aggressive items) were used to create a *Non-aggressive CD* subscale. Following recent work by Stringaris and colleagues (2009a), two further subscales based on the 8 DSM IV Oppositional Defiant Disorder items were also created and labelled *Irritable* and *Headstrong/Hurtful*. Tables 6.3 and 6.4 outline the range of subscales derived in these various ways.

Table 6.3: Factor analytic subscales

Aggression	Oppositionality
Cruel or nasty to others	Argues
Bullying or threatening people	Disobedient at home
Gets in many fights	Temper Tantrums/temper
Physically attacks people	Annoys people on purpose
Spiteful, tries to get revenge	Irritable or touchy or quick “to fly off the handle”
Hits others with things that could hurt	Blames others for things
Take something by force	Angry & hostile

Table 6.4: DSM IV-based subscales

Non-aggressive CD	Irritability	Headstrong
Cruel to animals	Temper Tantrums/temper	Argues
Cruel or nasty to others	Angry and hostile	Disobedient at home/school
Bullying/threatening people	Annoys people on purpose	Blames others for things
Vandalism/Destroys own/other things	Irritable, touchy or quick “to fly off the handle”	Spiteful, tries to get revenge
Runs away home		
Sets fires		
Steals at home/outside home		
Truants		
Lying/cheating		
Breaking and entering		
Stays out late		

As can be seen in Table 6.5, the internal reliability of all factor analytic and DSM IV-generated subscales at all ages was acceptable to good (α=0.68 to α=0.87).

Table 6.5: Internal reliability of factor analysis generated subscales at all ages

Age 12	**Internal Reliability α=**
Factor analysis generated subscales	
Aggression	0.84
Oppositionality	0.86
DSM IV based subscales	
Non-aggressive CD	0.75
• Irritable	0.77
• Headstrong/hurtful	0.78
Age 10	
Factor analysis generated subscales	
Aggression	0.84
Oppositionality	0.84
DSM IV based subscales	
Non-aggressive CD	0.74
• Irritable	0.74
• Headstrong/hurtful	0.76
Age 7	
Factor analysis generated subscales	
Aggression	0.85
Oppositionality	0.82
DSM IV based subscales	0.76
Non-aggressive CD	0.84
• Irritable	0.74
• Headstrong/hurtful	
Age 5	
Factor analysis generated subscales	
Aggression	0.80
Oppositionality	0.80
DSM IV based subscales	
Non-aggressive CD	0.68
• Irritable	0.70
• Headstrong/hurtful	0.68

Aggression scores

Aggression scores were created by summing the seven items in the factor analytic aggression subscale (range 0-14) at each age. Figures 6.1 to 6.4 show the distributions of these measures at ages 12, 10, 7 and 5 years. As expected in a general population sample, most mothers reported no aggression in their children (0), a small number reported moderate levels and very few reported high levels of aggression.

Figure 6.1: Distribution of aggression at age 12

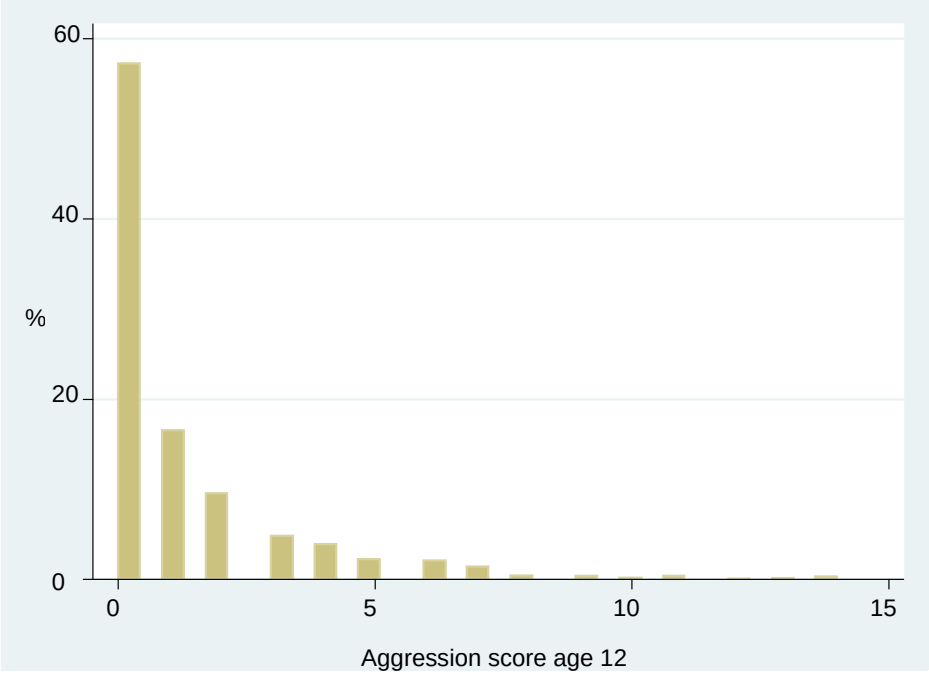


Figure 6.2: Distribution of aggression at age 10

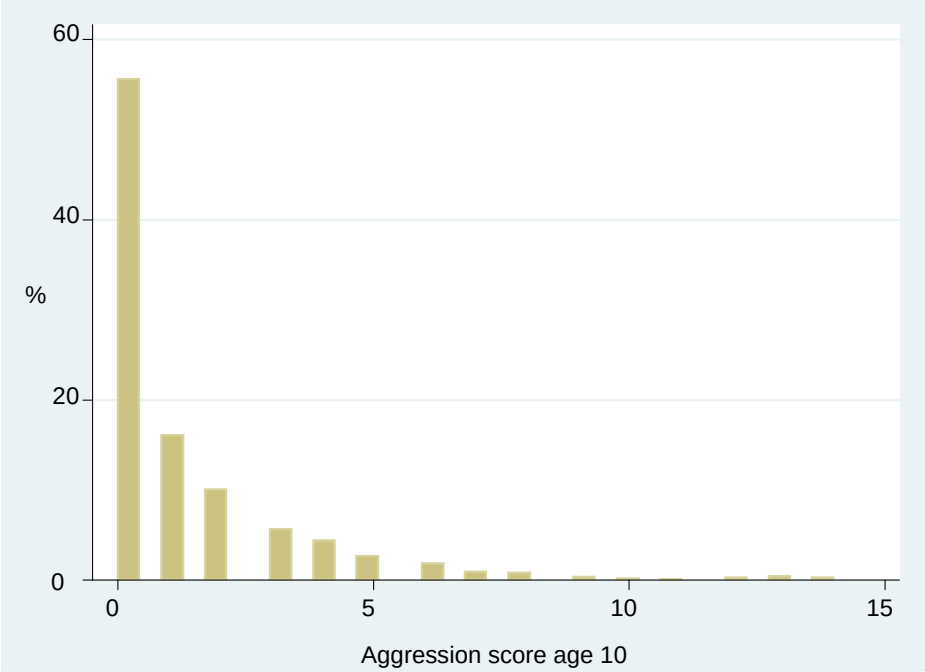


Figure 6.3: Distribution of aggression at age 7

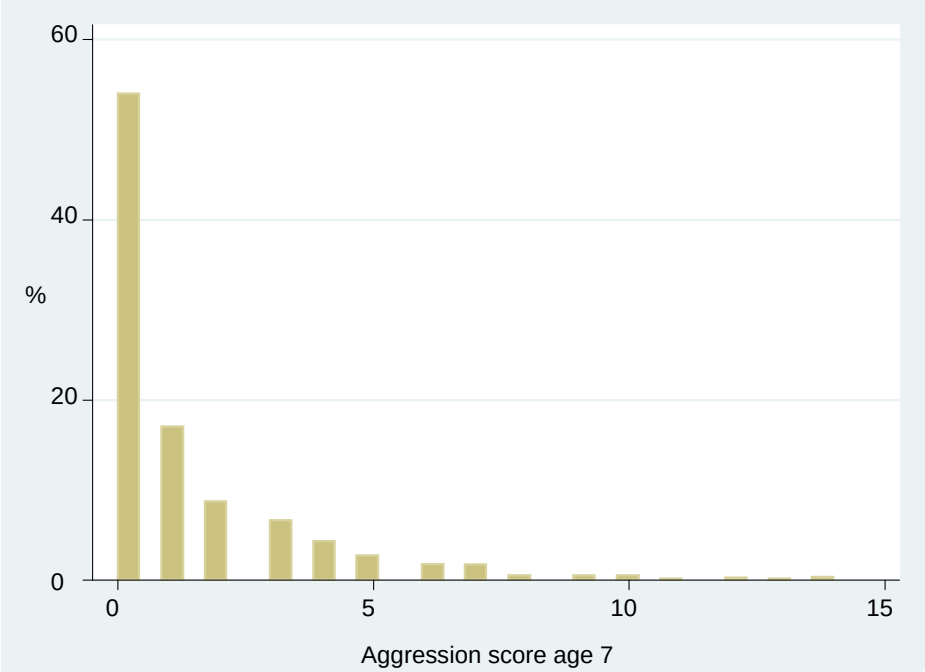
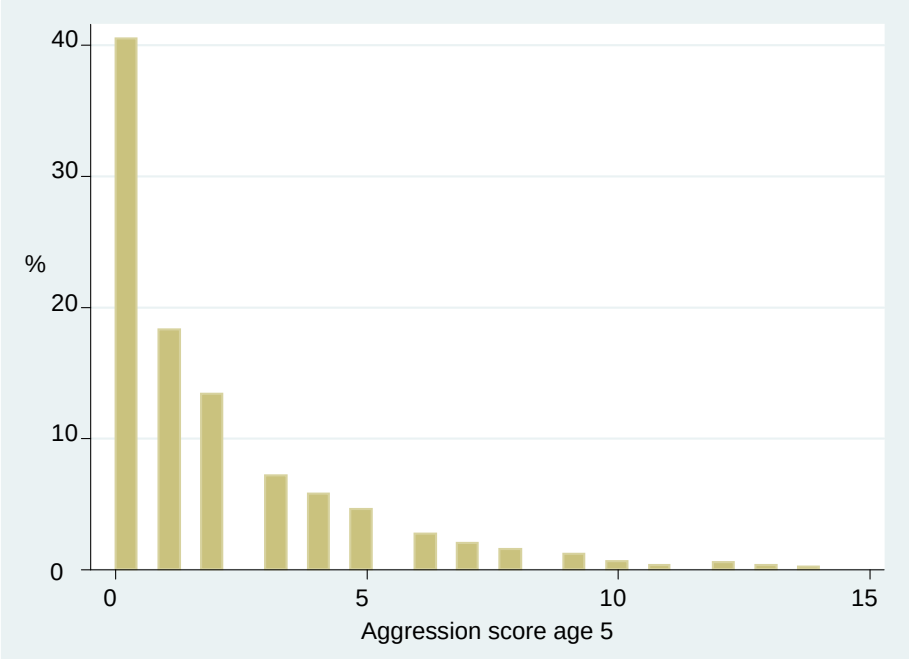


Figure 6.4: Distribution of aggression at age 5



Forming groups for comparisons of risk factors and correlates

For aims 2 and 3, four groups needed to be formed – (i. psychotic symptoms only, ii. aggression only, iii. co-occurring cases, and iv. neither (the reference group)) as a basis for comparisons of potential risk factors and correlates. The number of cases with psychotic symptoms was fixed (those with at least one definite symptom: N=125), but a number of approaches could be taken to derive a categorical definition of 'aggression', varying in terms of both severity at any given age and persistence across age. Therefore, a number of preliminary analyses of associations between psychotic symptoms and aggression were undertaken to guide selection of the most appropriate indicator of aggression.

Associations between psychotic symptoms and aggression: *preliminary analyses*

Psychotic symptoms and aggression at age 12

To begin with, associations between psychotic symptoms and maternal reports of aggression at age 12 were assessed. Firstly, mean differences in age 12 aggression scores were examined in children with and without psychotic symptoms (see Table 6.6), and secondly, cut-offs for aggression were assigned (see below), and the resulting categories were compared in terms of rates of children with and without psychotic symptoms (Table 6.7).

For age 12, the categories were:

- 0 = 0 “no aggression”
- 1 = 1 “moderate aggression”
- 2-14 (the top 26%) = 2 “high aggression”

As shown in Table 6.6, although mean aggression scores in children with psychotic symptoms were somewhat elevated in comparison with those for children with no psychotic symptoms, the differences fell short of statistical significance. Similarly, although rates of psychotic symptoms among children with moderate and high levels of aggression were higher than those of children with no aggression at age 12, the contrasts again failed to reach statistical significance.

Table 6.6: Mean differences in aggression at age 12 between cases with and without psychotic symptoms at age 12 (N=2,119)

	Psychotic symptoms absent (n=1995)	Psychotic symptoms present (n=124)	T	P
Aggression at age 12	1.2 (2.1)	1.5 (2.2)	1.7	0.08

Table 6.7: Rates of psychotic symptoms in cases with no, moderate and high aggression at age 12 (N=2,119)

	No aggression N (%)	Moderate aggression N (%)	High aggression N (%)
Psychotic symptoms absent	1,155 (95.1%)	327 (92.9%)	513 (92.8%)
Psychotic symptoms present	59 (4.9%)	25 (7.1%)	40 (7.2%)
Total	1,214	352	553
chi2(2) = 5.1 p = 0.08			

Psychotic symptoms and aggression at younger ages

In light of these findings, exploration began into the possibility of combining indicators of aggression at age 12 with indicators of a history of aggression earlier in childhood. To implement this, aggression scores at ages 5, 7 & 10 were categorised as:

- 0 = 0 “no aggression”,
- 1-2 = 1 “moderate aggression”,
- 3-14 (the top 20%) = 2 “high aggression”.

The decision to use slightly higher cut-points to define moderate and high aggression at these ages was based on developmental literature on aggression (see e.g. Tremblay, 2010), which suggests in general there is a decrease in the frequency of physical aggression with age, with younger children having higher rates of aggression than those approaching adolescence. As a result, severity thresholds for aggression at ages 5, 7 and 10 were increased.

Using these cut-offs, a definition of aggression was examined that required:

1. Some evidence of c*urrent aggression* (moderate *or* high at age 12) ***and***

2. *A history of aggression* (moderate aggression at three times points *or* high aggression at one time point and moderate aggression at two time points (at ages 5, 7 & 10 years).

This definition identified 577 children as aggressive, 27.1% of the sample. As Table 6.8 shows, this combined definition of past and current aggression was associated with psychotic symptoms.

Table 6.8: Rates of persistent aggression in cases with and without psychotic symptoms (N=2,114)

	Psychotic symptoms absent N (%)	Psychotic symptoms present N (%)
No aggression	1,461 (73.4%)	80 (64.5%)
Persistent aggression	529 (26.6%)	44 (35.5%)
Total	1,990	124
chi2(1) = 4.7 p = 0.03		

6.2.3 Final Samples

Using the definition of aggression outlined above four groups were constituted from 2,114 cases:

1. *Psychosis-only* (n=80): young people with at least one definite psychotic symptom but who did not meet the specified criteria for aggression.

2. *Aggressive-only* (n=529): young people with current aggression (age 12) plus some evidence of past aggression (at ages 5, 7 or 10) on symptoms of *1) cruel or nasty to others, 2) bullying or threatening people, 3) gets in many fights, 4) physically attacks people, 5) is spiteful, tries to get revenge, 6) hits others with things that could hurt, 7) takes something by force.*

3. *Co-occurring cases* (n=44): young people who met criteria for both psychotic symptoms and aggressive behaviour.

4. *Neither* (n=1,461): those with neither psychotic symptoms nor aggressive behaviour; these young people were used as the reference group.

Risk factors and correlates

A full list of the remaining measures used in this chapter is provided in Table 6.6 which includes information about each measure, its source and the age at which it was obtained. It is organized into sections outlining potential risk factors and correlates in relation to: (i) familial, social, neurodevelopment and home-rearing

factors; (ii) comorbid behavioural and emotional problems at age 12; (iii) behaviour problems and children's service contacts at age 10; behaviour behaviour problems at age 7; and behavioural and emotional symptoms, and educational problems and service contacts at age 5.

Table 6.9: Description of the investigated risk factors and correlates of children's psychotic symptoms

Measure	Respondent	Description of the measure	Age evaluated
Demographics	Mothers	Sex, ethnicity	5
Social factors			
Socio-economic disadvantage	Parents	Lowest tertile of socioeconomic index: a composite of parental income, education, and occupation.	5
Urban residence	Neighbours	Classification of children's neighbourhood as a city or other type of urban setting based on a community-level survey of over 5600 residents living in the same postcode (i.e., street or apartment building) as each E-Risk family.	12
Neurodevelopment			
Birth weight*	Parents	Absolute values were standardized according to standards of birth weight by gestational age of twins born in England in 1988-92, calculated as $Z=(x/M)^{L}-1/LS$ (Buckler & Green, 1994)	5
Multiple perinatal complications	Parents	2 or more of the following: high blood pressure, diabetes, pre-eclampsia, vaginal bleeding, water breaking > 11h before labour, slow baby growth, rubella during pregnancy.	5
IQ	Child	Wechsler Preschool and Primary Scale of Intelligence (WPPSI) Revised. (Wechsler, 1990) Children were administered two subtests: Vocabulary and Block Design. IQ scores were prorated, following procedures described by Sattler (Sattler,1992)	5
Executive functioning	Child	Children were administered three executive functions tests: Mazes (Grodzinsky & Diamond, 1992) is a WPPSI subtest; Day Night (Gerstadt, Hong, & Diamond A, 1994) is a nonverbal analogue of the Stroop task; Sentence Working Memory, based on the Baddeley model of working memory, (Baddeley, 1996) (Baddeley, 1986) requires the child to hold one (or more) item in active working memory while processing necessary information for the generation of the second (and so forth) item. Children's scores on the three tests were averaged and standardized.	5
Theory of mind	Child	Battery of Theory of Mind tasks (Hughes et al., 2000), administered in a set order of increasing difficulty. The test questions tapped children's ability to attribute a first-order false belief to a story character, to make inferences from an attributed false belief, and to attribute a second-order false belief to a story character. Children's responses were summed and standardized.	5

Measure	Respondent	Description of the measure	Age evaluated
Familiality			
Mother's antisocial behaviour	Mothers	Mothers reported their own histories of antisocial behaviour using the externalising syndrome of the Young Adult Self Report (YASR; Achenbach, 1997), modified to obtain lifetime data.	5
Father's antisocial behaviour	Mothers	Mothers reported about the biological fathers' histories of antisocial behaviour using the externalising syndrome of the Young Adult Behaviour Checklist (YABCL; Achenbach, 1997), modified to obtain lifetime data.	5
Maternal psychosis-spectrum disorder	Mothers	Diagnostic Interview Schedule (American Psychiatric Association, 1994), diagnosis according to DSM-IV (Robbins et al., 1995) plus evidence of social, occupational, or self-care dysfunction. Diagnosis reviewed by a clinician.	10
Psychiatric admission	Parents	First or second degree relatives who have ever been admitted to a psychiatric unit.	12
Family history of suicide	Parents	First or second degree relatives with positive history of attempted or completed suicide.	12
Parental service use	Mother	Includes parents having utilised: parent training programme, telephone help line or parents support group , other	10
Home-rearing			
Mother's partner status	Mother	No partner, partner, lives with biological dad.	5
Maternal expressed emotion*	Mother, coded by independent raters	Assessed using a 5-minute speech sample eliciting expressed emotion from the mother. Speech samples were audiotaped and coded by two independent raters. Maternal negativity (coded on a 6-point scale) is a global measure of the whole speech sample, indexing negativism expressed in the interview about the child. Maternal warmth (6-point scale) is a global measure of the whole speech sample, indexing warmth expressed in the interview about the child (Caspi et al., 2004).	5
Household chaos*	Mother Child	Items indicating extent of routine, privacy, predictability, and organization in the home (Evans et al., 2005).	12
Physical maltreatment	Mother, coded by clinicians	Interview using the reliable standardized clinical protocol from the Multi-Site Child Development Project, a protocol designed to enhance mothers' comfort with reporting valid child maltreatment information while also meeting researchers' legal & ethical responsibilities for reporting. Examples included: victim of adjudicated assault by a teenaged sibling, punished by being burned with matches, injured (e.g. fractures or dislocations) from neglectful or abusive parental care, and/or formally registered with a child protection team for physical abuse (Dodge et al.,1995;Kim-Cohen et al.,2006).	5,7,10,12

Peer victimisation			
Bullied	Mother	Has your child ever been bullied by another child?	7,10,12
Psychological harm from being bullied	Mother	Has your child suffered psychological harm as a consequence of being bullied?	7,10,12
Physical harm from being bullied	Mother	Has your child suffered physical harm as a consequence of being bullied?	7,10,12
Measure	**Respondent**	**Description of the measure**	**Age evaluated**
Comorbid behavioural and emotional problems at age 12			
Depressive symptoms	Child	Children's Depression Inventory (Kovacs, 1992).	12
Anxiety symptoms	Child	Multidimensional Anxiety Scale for Children (March et al., 1997).	12
Alcohol use or experimentation	Child	Have you ever tried alcohol?	12
Tobacco use or experimentation	Child	Have you ever tried smoking a cigarette?	12
Cannabis use or experimentation	Child	Have you ever tried any hash or cannabis?	12
Oppositionality	Mother	Variable derived from the CBCL externalising scale (Achenbach, 1991) using factor analysis	12
Irritability	Mother	Variable derived from the CBCL externalising scale (Achenbach, 1991).	12
Headstrong	Mother	Variable derived from the CBCL externalising scale (Achenbach, 1991).	12
Non-aggressive conduct problems	Mother	Variable derived from the CBCL externalising scale (Achenbach, 1991).	12
Behaviour at age 10 and service contacts			
Oppositionality	Mother	Variable derived from the CBCL externalising scale (Achenbach, 1991) using factor analysis	10
Irritability	Mother	Variable derived from the CBCL externalising scale (Achenbach, 1991).	10
Headstrong	Mother	Variable derived from the CBCL externalising scale (Achenbach, 1991).	10
Non-aggressive conduct problems	Mother	Variable derived from the CBCL externalising scale (Achenbach, 1991).	10
Service Use - child	Mother	Includes the child having utilised two or more of the following: psychiatrists, medical	10

		doctor, GP, emergency services, emergency psychiatric services, educational psychologist, other psychologist, counsellor, psychotherapist, behaviour therapist, family therapist, social worker, child development / health worker, day care centre, counselling centre, speech and language therapist or special education service or SENCO.	
Behaviour at age 7			
Oppositionality	Mother	Variable derived from the CBCL externalising scale (Achenbach, 1991) using factor analysis	7
Irritability	Mother	Variable derived from the CBCL externalising scale (Achenbach, 1991).	7
Headstrong	Mother	Variable derived from the CBCL externalising scale (Achenbach, 1991).	7
Non-aggressive CD	Mother	Variable derived from the CBCL externalising scale (Achenbach, 1991).	7
Measure	**Respondent**	**Description of the measure**	**Age evaluated**
Behaviour, emotional symptoms, & education at age 5			
Oppositionality	Mother	Variable derived from the CBCL externalising scale (Achenbach, 1991) using factor analysis	5
Irritability	Mother	Variable derived from the CBCL externalising scale (Achenbach, 1991).	5
Headstrong	Mother	Variable derived from the CBCL externalising scale (Achenbach, 1991).	5
Non-aggressive conduct problems	Mother	Variable derived from the CBCL externalising scale (Achenbach, 1991).	5
ADHD symptoms*	Mother Teacher	DSM-IV Attention/Deficit Hyperactivity Disorder items. (American Psychiatric Association, 1994; Kuntsi et al. 2004)	5
Internalising problems*	Mother Teacher	CBCL/Teacher Report Form (TRF) (Achenbach, 1991) anxiety, withdrawn, and somatic subscales.	5
Social isolation†	Mother Teacher	Positive endorsement of CBCL/TRF (Achenbach, 1991) items (Would rather be alone than with others; Not liked by other children).	5
Educational problems	Teacher	1 or more of the following: referred to special educational service, works less hard than other students, is learning less than other students (Achenbach, 1991).	5
Special education/ social services	Teacher	Has the pupil ever been referred for a special education programme or to social services?	5

*Standardized values to mean=0 and SD=1.

†The social isolation items in the withdrawn subscale of the CCBCL/TRF were analysed separately.

6.2.4 Statistical analysis

To test group comparisons on risk factors and correlates, multinomial logistic regression analyses comparing the four groups of young people was used. Univariable associations were investigated by calculating odds ratios (ORs) with 95% confidence intervals (CIs). Individual risk factors significant at the 5% level were then entered into multivariable analyses. As the sample contained two children from each family (leading to non-independent observations), all regression tests and confidence intervals were based on the sandwich variance estimator, a method which is available in the statistical package STATA 11 (StataCorp. 2009). Application of this technique allows for the relaxation of the assumption of independence of observations by penalising estimated standard errors and therefore accounting for the dependence in the data due to analysing sets of twins.

Power calculations

Power calculations were carried out to identify the rates of risk factor exposure needed in the co-occurring group to detect group differences from each pure group with 80% power at an alpha level of 0.05, at selected levels of risk in each pure group (5%, 10%, 20%, 30%) for categorical variables (Table 6.7). The mean differences required for continuous variables are provided in Table 6.8.

Table 6.10: Power calculations for categorical variables

Psychosis only vs. Co-occurring		**Aggressive only vs. Co-occurring**		**Neither vs. Co-occurring**	
Psychosis only (n=80)	Co-occurring (n=44)	Aggressive only (n=529)	Co-occurring (n=44)	Neither (n=1461)	Co-occurring (n=44)
Assumed risk exposure	*Minimum risk exposure to detect difference*	*Assumed risk exposure*	*Minimum risk exposure to detect difference*	*Assumed risk exposure*	*Minimum risk exposure to detect difference*
5%	23%	5%	27%	5%	28%
10%	33%	10%	27%	10%	26%
20%	46%	20%	40%	20%	40%
30%	58%	30%	52%	30%	52%

Table 6.11: Power calculations for continuous variables

Assumed standard deviation		**Mean difference required**
Psychosis only (n=80) SD 1.4	Co-occurring (n=44) SD 1.8	0.9
Aggressive only (n=529) SD 2.0	Co-occurring (n=44) SD 1.8	0.8
Neither (n=1461) SD 1.3	Co-occurring (n=44) SD 1.8	0.75

The figures suggest that the sample should have adequate power to detect group differences that are likely to be of clinical and/or theoretical significance.

6.3 Results

6.3.1 Associations between psychotic symptoms and aggression

As previously outlined, 80 young people met study criteria for psychotic symptoms only, 529 were classified as aggressive only, and 44 showed both patterns of difficulty. Using these definitions, psychotic symptoms and aggressive behaviour were significantly associated (χ^2 (1) = 4.68 $p<0.05$). In addition, similar to the pattern of findings in study 1, aggressive behaviour was a more common accompaniment of psychotic symptoms - with 35.5% (44/124) of those reporting psychotic symptoms also reporting aggressive behaviour - than psychosis was of aggressive behaviour, where 7.7% (44/573) of individuals displaying aggressive behaviour also reported psychotic symptoms.

6.3.2 Bivariate analyses of risk factors and correlates of the co-occurring group compared to the psychosis-only, aggression-only and neither (reference) groups

Demographic, social and neurodevelopmental characteristics

Information on demographic, social and neurodevelopmental characteristics of the children in each group is provided in Table 6.12. There were no differences between the co-occurring and psychosis-only and aggressive-only groups in terms of gender ratios or ethnicity, although children in the co-occurring group were significantly less likely to be female than those with neither psychosis nor aggression. Co-occurring

cases were almost three times more likely than young people displaying neither psychosis nor aggression to be socially disadvantaged, and consistent with the findings in chapter 3, co-occurring cases were significantly more likely to be from a low social class than those in the psychosis-only group (and not to differ from the aggressive-only cases in this respect). With regards to urban residence, rates were elevated for children in the co-occurring group compared to all three other groups but only significantly so compared to young people neither pattern of difficulty. In terms of neurodevelopmental factors, there were no significant differences across the four groups with respect to birth complications. Co-occurring cases had significantly lower birth weights than the aggressive-only group and significantly lower mean scores of executive functioning compared to young people with neither psychosis nor aggression. Compared to all three other groups, children in the co-occurring group were significantly more likely to have a lower IQ and impaired theory of mind.

Table 6.12: Demographics, social factors and neurodevelopment

	Co-occurring (N=44) (%)	**Psychosis only (N=80)** (%)	**Aggressive only (N=529)** (%)	**Neither (N=1461)** (%)	**Group Contrasts**					
					Co-occurring vs. Psychosis		**Co-occurring vs. Aggression**		**Co-occurring vs. Neither**	
					OR	95% CI	OR	95% CI	OR	95% CI
Demographics										
Sex										
Male	65.9	51.3	60.9	43.7	--	--	--	--	--	--
Female	34.1	48.7	39.1	56.3	0.54	0.25-1.19	0.80	0.40-1.60	0.40	0.20-0.79*
Ethnicity										
White	90.9	95.0	91.9	89.3	--	--	--	--	--	--
Non-white	9.1	5.0	8.1	10.7	1.89	0.45-8.03	1.13	0.31-4.05	0.83	0.23-2.94
Social Factors										
Low Social Class	54.5	35.0	41.8	29.4	2.26	1.03-4.93*	1.68	0.87-3.25	2.95	1.53-5.67***
Urban Residence	67.4	55.1	51.5	47.8	1.69	0.77-3.69	1.95	0.98-3.87	2.28	1.16-4.47**
Neurodevelopment										
Birth weight *mean (SD) z score*	-0.21 (0.99)	-0.11 (0.87)	0.12 (0.96)	-0.02 (1.01)	0.90	0.65-1.25	0.72	0.54-0.97**	0.81	0.60-1.09
Birth complications (%)	32.5	23.1	26.4	24.2	1.57	0.66-3.71	1.34	0.65-2.76	1.45	0.71-2.94
IQ, *mean (SD)*	85.0 (13.5)	91.4 (14.0)	94.6 (14.7)	96.9 (14.2)	0.97	0.94-0.99**	0.95	0.93-0.97***	0.94	0.92-0.96***
Executive Functioning *mean (SD)*	10.5 (3.2)	11.4 (3.3)	11.3 (3.3)	11.7 (3.0)	0.91	0.81-1.03	0.92	0.83-1.02	0.88	0.80-0.97*
Theory of Mind *mean (SD)*	2.5 (2.6)	4.1 (3.1)	4.4 (3.2)	4.7 (3.3)	0.83	0.73-0.95**	0.81	0.72-0.91***	0.79	0.71-0.89***

*p < 0.05 ** p < 0.01 *** p < 0.001

Familiality, home rearing and peer victimisation

Table 6.13 describes indicators of familiality, home rearing difficulties and peer victimisation. Compared to all three other groups, children in the co-occurring group were significantly more likely to have mothers and fathers with antisocial behaviour. Co-occurring cases did not differ from psychosis-only or aggressive-only groups on maternal psychosis, but were significantly more likely than those with neither psychosis nor aggression to have mothers with psychosis-spectrum disorders. No significant differences were found across the four groups in terms of relatives being hospitalised/attempting suicide or parents accessing services for mental health problems.

With regards to home rearing risk factors, rates of single parenthood were somewhat (but not significantly) higher in the co-occurring group and children in the co-occurring group were significantly less likely to live with both biological parents compared to children in the psychosis-only group. Children in the co-occurring group were significantly less likely to have been rated as receiving maternal warmth at age 5 compared to those in the psychosis-only group and young people with neither difficulties, but did not differ from the aggressive-only group. Child reports of chaos at home suggested significantly higher rates in the co-occurring group compared to all other groups, whereas mother reports of chaos at home suggested similar rates to the aggressive-only group and significantly higher rates for the co-occurring group compared to the psychosis-only group and those with neither psychosis nor aggression. Rates of maltreatment were significantly elevated for the co-occurring group compared to all three other groups, with maternal reports suggesting that a third of the co-occurring cases had been victims of abuse. With regards to being

bullied, there were no differences between the co-occurring and psychosis-only cases but co-occurring cases were significantly more likely to be bullied than children in the aggressive-only group and children with neither difficulty. From those that were bullied, young people in the co-occurring group were significantly more likely to be reported as suffering psychological and physical harm compared to those with neither psychosis nor aggression, but did not differ from the psychosis-only or aggressive-only cases in this respect.

Table 6.13: Familial, home rearing and peer victimisation

	Co-occurring (**N=44**) Mean (SD)	**Psychosis only** (**N=80**) Mean (SD)	**Aggressive only** (**N=529**) Mean (SD)	**Neither** (**N=1461**) Mean (SD)	**Group Contrasts**					
					Co-occurring vs. Psychosis		**Co-occurring vs. Aggression**		**Co-occurring vs. Neither**	
					OR	95% CI	OR	95% CI	OR	95% CI
Familiality										
Maternal Psychosis *(%)*	16.3	7.9	9.1	3.5	2.26	0.65-7.86	1.95	0.72-5.24	5.31	2.07-13.6***
Parent's service use *(%)*	4.5	5.1	8.2	4.9	0.83	0.14-4.91	0.52	0.12-2.25	0.85	0.19-3.81
Mother's antisocial behaviour (z score)	0.71 (1.16)	-0.02 (0.83)	0.33 (1.16)	-0.14 (0.89)	1.77	1.31-2.39***	1.28	1.01-1.62*	2.06	1.62-2.61***
Father's antisocial behaviour (z score)	0.73 (1.20)	-0.19 (0.73)	0.28 (1.11)	-0.11 (0.93)	2.19	1.59-3.01***	1.35	1.06-1.71**	1.98	1.55-2.53***
Relatives in hospital for MI	0.11 (0.21)	0.10 (0.20)	0.09 (0.17)	0.07 (0.16)	1.17	0.13-9.50	1.77	0.26-12.1	3.43	0.52-22.4
Mothers relatives attempted suicide	0.03 (0.08)	0.04 (0.09)	0.04 (0.11)	0.03 (0.11)	0.46	0.02-8.43	0.46	0.03-6.45	0.73	0.05-10.1
Home rearing										
Mother partnership status (%)										
No Partner	25.0	8.7	16.6	12.8	--	--	--	--	--	--
Partner	6.8	8.7	11.3	7.9	0.28	0.06-1.40	0.41	0.10-1.58	0.48	0.12-1.86
Biological Dad	79.3	72.0	82.5	68.2	0.30	0.09-0.90*	0.63	0.28-1.44	0.46	0.20-1.04
Maternal Warmth	0.48 (0.31)	0.64 (0.26)	0.56 (0.26)	0.64 (0.27)	0.12	0.03-0.47**	0.37	0.12-1.77	0.14	0.04-0.44***
Maltreatment *(%)*	34.1	5.0	10.4	3.2	9.64	3.20-29.1***	4.43	2.13-9.20***	14.8	6.79-32.2***
Chaos at Home – child report	9.7 (4.2)	7.9 (4.5)	7.1 (4.3)	5.8 (3.9)	1.08	1.01-1.16*	1.13	1.06-1.19***	1.21	1.15-1.28***
Chaos at Home – mother report	8.1 (4.4)	5.6 (4.2)	7.2 (4.3)	4.7 (3.6)	1.15	1.06-1.23***	1.05	0.98-1.11	1.22	1.14-1.30***
Peer victimisation										
Bullied *(%)*	27.3	39.2	13.3	8.4	0.57	0.27-1.24	2.45	1.22-4.90***	4.06	2.06-8.01***
Psychological harm from being bullied *(%)*	31.8	21.5	21.5	12.8	1.72	0.77-3.84	1.69	0.87-3.29	3.15	1.65-6.02***
Physical harm from being bullied *(%)*	15.9	13.7	9.6	5.6	1.09	0.37-3.15	1.73	0.73-4.09	2.80	1.20-6.52**

*p < 0.05 ** p < 0.01 *** p < 0.001

Comorbid behavioural and emotional problems at age 12

Table 6.14 describes concurrent behavioural and emotional problems at age 12. As reported in studies 1 and 2, co-occurring cases did not differ from aggressive-only cases in rates of other antisocial and non-aggressive conduct behaviours, but were significantly more likely to engage in these behaviours compared to children in the psychosis-only group and children displaying neither pattern of difficulty. In terms of alcohol use/experimentation, co-occurring cases did not differ from the other groups; they were, however significantly more likely than all three other groups to have smoked, with over a third having used/experimented with tobacco by age 12. With regards to cannabis use/experimentation, rates for all groups were low (in particular there were no children in the co-occurring group that had tried cannabis), and no significant differences were found across all four groups. As in studies 1 and 2, co-occurring cases did not differ from psychosis-only cases in terms of concurrent emotional symptoms of depression or anxiety, but young people reported significantly higher rates of emotional difficulties compared to the aggressive-only cases and children neither psychosis nor aggression.

Table 6.14: Comorbid behavioural and emotional problems at age 12

	Co-occurring (**N=44**) Mean (SD)	**Psychosis Only** (**N=80**) Mean (SD)	**Aggressive only** (**N=529**) Mean (SD)	**Neither** (**N=1461**) Mean (SD)	**Group Contrasts – Odds ratio / χ^2**					
					Co-occurring vs. Psychosis		**Co-occurring vs. Aggression**		**Co-occurring vs. Neither**	
					OR	95% CI	OR	95% CI	OR	95% CI
Oppositionality	7.0 (3.1)	3.6 (2.8)	6.1 (3.4)	3.2 (2.7)	1.36	1.22-1.51***	1.07	0.99 - 1.15	1.44	1.33 -1.57***
Irritability	3.5 (1.8)	1.7 (1.7)	3.0 (2.1)	1.4 (1.5)	1.59	1.32-1.92***	1.12	0.98 - 1.25	1.77	1.56 - 2.02***
Headstrong	4.0 (1.7)	2.1 (1.6)	3.7 (2.0)	1.9 (1.6)	1.69	1.40-2.03***	1.07	0.93 - 1.22	1.86	1.61 - 2.14***
Non-aggressive conduct problems	2.9 (2.8)	0.8 (1.2)	2.2 (2.6)	0.6 (1.2)	1.60	1.32-1.94***	1.07	0.98 - 1.17	1.87	1.62 - 2.15***
Alcohol use/ experimentation (%)	61.5	58.2	55.5	44.8	1.08	0.50-2.33	1.26	0.62-2.56	1.81	0.89 - 3.64
Smoking use/ experimentation (%)	37.8	19.2	19.4	8.0	2.47	1.05-5.83*	2.51	1.26-4.98**	6.62	3.34 -13.1***
Cannabis use/ experimentation (%)	0.0	2.5	1.5	0.8	χ^2 (3) = 4.52 p = 0.210					
Depression Scale	9.2 (10.5)	6.4 (8.1)	3.4 (5.8)	2.6 (4.3)	1.44	0.72-2.85	3.45	1.66-7.15***	5.52	2.49 - 12.2***
Anxiety Scale	9.6 (3.2)	9.2 (3.0)	7.5 (3.1)	7.5 (2.9)	0.99	0.98-1.00	3.26	1.74-6.10***	3.86	2.03 - 7.31***

*p < 0.05 ** p < 0.01 *** p < 0.001

Behaviour problems at ages 10 & 7 and age 10 service contacts

Indicators from ages 10 and 7 years are examined in Table 6.15. Twelve year old children with both psychosis and aggression were also significantly more likely to have engaged in other antisocial/non-aggressive conduct behaviours at ages 10 and 7 compared to those in the psychosis-only group and children with neither psychosis nor aggression. They did not (at either age) differ from the aggressive-only cases. Although rates of contact with physical and mental health services were elevated for co-occurring cases in comparison to all three other groups at age 10, they were only significantly higher compared to children displaying neither difficulty.

Behaviour, emotional symptoms and educational problems at age 5

The same pattern of group contrasts in other antisocial/non-aggressive behaviours was also evident in early childhood (Table 6.16), with maternal reports at age 5 suggesting children in the co-occurring group were significantly more likely than the psychosis-only cases and children with neither psychosis nor aggression to engage in these behaviours (and not differ from the aggressive-only cases). Combined mother and teacher reports also suggested that children in the co-occurring group at age 12 had significantly elevated rates of internalising problems and ADHD symptoms compared to all three other groups at age 5. Maternal reports suggested that co-occurring cases were significantly more likely be socially isolated than children displaying neither pattern of difficulty (and not differ from either the psychosis-only or aggressive-only group), whereas teacher reports suggested no significant group differences on this indicator. According to teacher reports, children in the co-occurring group were less likely to hard working or be well behaved

compared to those in all three other groups. In addition, teachers stated that just under a half of the co-occurring cases had been referred to special education/social services by age 5; these rates were significantly higher than those in the aggressive-only group and those with neither pattern of difficulty, but did not differ from the psychosis-only group.

Table 6.15: Behavioural risk factors at ages 10 & 7 and service contact

	Co-occurring (**N=44**) Mean (SD)	**Psychosis Only** (**N=80**) Mean (SD)	**Aggressive only** (**N=529**) Mean (SD)	**Neither** (**N=1461**) Mean(SD)	**Group Contrasts**					
					Co-occurring vs. Psychosis		**Co-occurring vs. Aggression**		**Co-occurring vs. Neither**	
					OR	95% CI	OR	95% CI	OR	95% CI
Age 10										
Oppositionality	6.7 (3.3)	3.5 (2.6)	6.1 (3.3)	3.2 (2.7)	1.21	1.30-1.52***	1.04	0.95-1.13	1.41	1.29-1.54***
Irritability	3.4 (2.0)	1.6 (1.4)	2.9 (2.0)	1.4 (1.5)	1.62	1.34-1.96***	1.11	0.97-1.28	1.76	1.52-2.02***
Headstrong	3.9 (2.0)	2.1 (1.8)	3.9 (2.0)	1.9 (1.6)	1.63	1.34-1.99***	0.99	0.85-1.16	1.70	1.45-1.99***
Non-aggressive conduct problems	2.6 (2.7)	0.7 (1.1)	2.3 (2.7)	0.6 (1.2)	1.65	1.34-2.04***	1.03	0.94-1.13	1.79	1.56-2.05***
Child's service use (%)	25.0	17.5	17.0	7.8	1.41	0.56-3.54	1.58	0.76-3.27	3.36	1.61-7.02***
Age 7										
Oppositionality	7.3 (3.3)	4.0 (2.7)	6.2 (3.2)	3.4 (2.7)	1.36	1.21-1.52***	1.09	0.99-1.19	1.47	1.34-1.61***
Irritability	3.5 (2.1)	1.5 (1.5)	2.9 (2.1)	1.3 (1.5)	1.65	1.36-2.00***	1.13	0.99-1.30	1.79	1.53-2.04***
Headstrong	4.6 (2.1)	2.7 (1.8)	4.0 (1.9)	2.2 (1.7)	1.63	1.33-1.99***	1.16	0.98-1.37	1.90	1.60-2.26***
Non-aggressive conduct problems	2.9 (2.3)	0.9 (1.3)	2.3 (2.5)	0.7 (1.3)	1.55	1.28-1.87***	1.08	0.98-1.18	1.76	1.55-1.99***

*p < 0.05 ** p < 0.01 *** p < 0.001

Table 6.16: Behavioural, emotional and educational risk factors at age 5

	Co-occurring (**N=44**) Mean (SD)	**Psychosis only** (**N=80**) Mean (SD)	**Aggressive only** (**N=529**) Mean (SD)	**Neither** (**N=1461**) Mean (SD)	**Group Contrasts**					
					Co-occurring vs. Psychosis		**Co-occurring vs. Aggression**		**Co-occurring vs. Neither**	
					OR	95% CI	OR	95% CI	OR	95% CI
Oppositionality	7.6 (3.5)	4.1 (2.8)	6.7 (3.3)	4.1 (2.9)	1.37	1.23-1.53***	1.07	0.98-1.17	1.38	1.26-1.50***
Irritability	3.7 (2.3)	1.7 (1.5)	3.1 (2.1)	1.7 (1.7)	1.64	1.38-1.95***	1.13	0.99-1.29	1.61	1.41-1.84***
Headstrong	4.4 (1.9)	2.7 (1.7)	4.2 (1.9)	2.6 (1.8)	1.59	1.32-1.92***	1.06	0.91-1.22	1.62	1.40-1.88***
Non-aggressive conduct problems	3.6 (2.8)	1.1 (1.5)	2.7 (2.6)	1.1 (1.7)	1.53	1.30-1.81***	1.08	0.99-1.18	1.56	1.40-1.73***
Internalising problems (M & T report) (z score)	0.84 (1.29)	-0.004 (0.92)	0.21 (1.02)	-0.09 (0.95)	1.89	1.40-2.56***	1.54	1.23-1.92***	2.12	1.69-2.67***
ADHD Symptoms (M & T report) (z score)	0.79 (1.13)	0.09 (0.98)	0.41 (1.10)	-0.18 (0.88)	1.69	1.20-2.38**	1.31	1.01-1.71*	2.26	1.72-2.96***
Social Isolation – Mother (%)	15.9	6.2	10.2	3.6	2.68	0.78-9.16	1.63	0.70-3.81	4.68	1.99-11.0***
Social Isolation – Teacher (%)	7.0	5.6	4.4	2.2	1.17	0.31-4.41	1.56	0.44-5.54	2.96	0.86-10.2
Education (hardworking /good behaviour)	6.4 (2.3)	7.9 (2.2)	8.2 (2.5)	8.9 (2.3)	0.78	0.66-0.93**	0.74	0.64-0.85***	0.66	0.57-0.77***
Referred special education/Social Services (%)	47.6	28.8	21.6	12.0	2.04	0.91-4.57	3.19	1.63-6.25***	5.83	2.95-11.5***

*p < 0.05 ** p < 0.01 *** p < 0.001

6.3.3 Multivariate Analyses

Although the previous two studies were informative about risk factors for co-occurring psychosis and aggression at the level of bivariate analyses, this is the first study that has the statistical power to allow for multivariable analyses to identify independent risk factors. As outlined in the previous sections, bivariate analyses identified an extensive list of risk factors in the current study; given that they may overlap, however, it is important to identify which operate independently from one another. To investigate this, all early risk factors that were significant in the bivariate analyses were entered into multivariable models. To maximise temporal precedence, the focus was on factors assessed at age 5.

The next three sections report findings from these models, approaching the identification of independent risk factors in three different ways. The first two sections focus in turn on young people with each 'pure' disorder, and explore independent predictors of the other disorder within that group (i.e. independent predictors of aggression among children with psychotic symptoms and independent predictors of psychosis among children with persistent aggression). The third section focuses on identifying independent predictors for psychosis and co-occurring aggression within the sample as a whole.

<u>Predictors of aggression in young people with psychotic symptoms</u>

Firstly, to identify independent predictors of aggression in children with psychotic symptoms, all four groups were entered into a multivariable model; all early risk factors (at age 5) that were significant in the bivariate analyses reported earlier were entered into a multivariable model. The psychosis-only group was taken as the

reference category, and predictors of the co-occurring group (the dependent, outcome variable) were examined.

As described in Table 6.17, within a group of children with at least one definite psychotic symptom, independent risk factors for aggression were: low theory of mind scores, high rates of irritability, father's antisocial behaviour and the experience of maltreatment.

Table 6.17: Independent predictors of aggression in those displaying psychotic symptoms using multinomial logistic regression (N=107)

Predictor	**OR (95% CI)**
Theory of Mind	0.88 (0.77 – 0.99) *
Irritability	1.45 (1.21 – 1.74)***
Father's antisocial behaviour	1.03 (1.01 – 1.05)**
Maltreatment^	3.88 (1.22 – 12.4)*

*p < 0.05 ** p < 0.01 *** p < 0.001

^ Maltreatment was included despite being a composite measure at ages 5, 7, 10 and 12 as the majority of cases were reported at age 5

<u>Predictors of psychotic symptoms in young people with persistent aggression</u>

Secondly, to identify independent predictors of psychotic symptoms in those displaying aggression, all significant age 5 risk factors identified in the bivariate analyses were entered into multivariable models in a similar way. The aggression-only group was then assigned as the reference category and the results for the co-occurring group were examined.

As shown in Table 6.18 within a group of children with persistent aggressive behaviour, independent risk factors for psychosis were low IQ, internalising problems, the presence of ADHD symptoms, not hardworking/poor behaviour with respect to education and (once again) maltreatment.

Table 6.18: Independent predictors of psychotic symptoms in those with persistent aggression using multinomial logistic regression (N=512)

Predictor	**OR (95% CI)**
IQ	0.97 (0.94 – 0.99)*
Internalising problems	1.04 (1.01 – 1.07)**
ADHD symptoms	0.96 (0.93 – 0.99)*
Education (hardworking /good behaviour)	0.76 (0.65 – 0.89)***
Maltreatment^	3.03 (1.39 – 6.61)**

*p < 0.05 ** p < 0.01 *** p < 0.001

^ Maltreatment was included despite being a composite measure at ages 5, 7, 10 and 12 as the majority of cases were reported at age 5

Predictors of psychosis and co-occurring aggression in the whole sample

As a third approach, the psychosis-only, aggression-only and neither groups were combined (N=2070) and contrasted with co-occurring cases (N=44) to examine predictors of the combination of problems. Once again, all age 5 risk factors that were significant in the bivariate analyses were entered into multivariable models as predictor variables.

In the course of identifying the most parsimonious model, collinearity was identified between IQ and theory of mind; both variables were significant independent predictors of psychosis and co-occurring aggression in a model including these two variables alone, but the modest association between them (r=.4) resulted in

collinearity (i.e. both variables falling just short of conventional levels of significance) when considered alongside other predictors. To illustrate the findings, Table 6.21 presents results from three models. In the first, both IQ and theory of mind are included, along with the other key predictors of co-occurring psychosis and aggression in the full sample: internalising problems, not working hard/poor behaviour in school, maltreatment and oppositional behaviour. In the second and third models, each predictor was entered separately alongside the other significant factors. As can be seen, although significance levels varied, the odds ratios for each predictor were very similar in each case. Given the importance of both low IQ and poor theory of mind as risks for both psychosis and aggression in prior literature, it seems likely that both may function as risks for the co-occurring pattern.

Table 6.19: Independent predictors of psychosis and co-occurring aggression in the whole sample using logistic regression (N=1963)

Predictor	**OR (95% CI) Model 1**	**OR (95% CI) Model 2 (IQ & not ToM)**	**OR (95% CI) Model 3 (ToM & not IQ)**
IQ	0.99 (0.95 - 1.00)	0.97 (0.95 – 0.98)*	-
Theory of mind	0.89 (0.79 - 1.02)	-	0.87 (0.77 - 0.98)*
Internalising problems	1.03 (1.01 - 1.06)*	1.03 (1.01 – 1.06)*	1.03 (1.01 - 1.06)*
Education (hardworking / good behaviour)	0.83 (0.73 - 0.94)**	0.82 (0.72 - 0.93)**	0.80 (0.71 - 0.91)**
Maltreatment^	3.99 (1.76 - 9.04)**	4.02 (1.75 - 9.24)**	4.31 (1.93 - 9.58)**
Oppositional behaviour	1.11 (0.73 - 0.94)*	1.10 (1.00 - 1.22)*	1.12 (1.01 - 1.23)*

*p < 0.05 ** p < 0.01 *** p < 0.001

^ Maltreatment was included despite being a composite measure at ages 5, 7, 10 and 12 as the majority of cases were reported at age 5

To summarise, from the wide-ranging list of risk factors identified in the bivariate analyses, independent predictors of aggression in those with psychotic symptoms were poor theory of mind, high rates of irritability, father's antisocial behaviour and maltreatment. Independent risk factors for psychosis in those displaying persistent aggressive behaviour were low IQ, internalising problems, ADHD symptoms, not working hard/poor behaviour in school and maltreatment. Finally, independent predictors for the combined patterns of problems (psychosis and co-occurring aggression) were low IQ, poor theory of mind, internalising problems, not working hard/poor behaviour in school, maltreatment and oppositional behaviour. The implications of these findings will be discussed further in the next section.

6.4 Discussion

In the current study, the association between psychotic symptoms at age 12 and aggressive behaviour was examined using prospective longitudinal data. The prevalence of psychotic symptoms was 5.9%, which is similar to the reported prevalence of childhood psychotic symptoms in other current community samples of adolescents between ages 11 and 17 years (Scott et al, 2009; Dhossche et al., 2002; Yoshizumi et al., 2004; Horwood et al., 2008; Yung et al., 2009) (although prevalence estimates vary as the measures and numbers of questions used to assess psychotic symptoms vary). Additionally, hallucinations were the most frequent psychotic symptom reported, a pattern previously reported in community (Horwood et al., 2008; Kelleher et al., 2008) and clinical samples (Biederman et al., 2004; Ulloa et al., 2000).

As a first step, the association between aggression at age 12 and psychotic symptoms was assessed. Although rates of aggression were higher among children with psychotic symptoms compared to those with no psychotic symptoms, comparisons fell just short of statistical significance. One reason for this could be that aggression was possibly somewhat underreported at age 12, as only maternal reports were used; it is possible that mothers may not be aware of all aggressive behaviours, especially those that occur outside the home, among young people of this age. As a result it may be useful for future studies to include self-reports of aggression as well as those of other informants.

As a second approach, indicators of a prior history of aggression at ages 5, 7 and 10 years were included, as well as aggression at age 12, to define aggression. This indicator was significantly associated with psychotic symptoms. Just over a third of young people reporting psychotic symptoms also displayed aggressive behaviour on this definition, whereas only 7.7% of those with aggression also reported psychotic symptoms. These figures are comparable to those reported in an adult general population sample, where 33.3% of individuals with schizophrenia-spectrum disorders also report that they have been involved in violent behaviour (Arseneault et al. 2000).

It was hypothesised that the co-occurring group would have higher rates of unfavourable neurodevelopment markers; non-aggressive antisocial behaviours at all four ages; and exposure to adverse experiences including poor home environments, parental antisocial behaviour and maltreatment compared to the psychosis-only cases but would not differ from the aggressive-only cases.

Consistent with the proposed hypothesis, co-occurring cases resembled aggressive-only cases (and differed from the psychosis-only group) on levels of associated behavioural problems at all four ages; some unfavourable neurodevelopmental markers; and exposure to some adversities, although rates for the co-occurring cases were elevated compared to both pure groups on particular unfavourable neurodevelopmental markers (poor theory of mind, low IQ), and adverse experiences (maltreatment). Further details for each group and their associated features are provided below.

6.4.1 Co-occurring cases in comparison with psychosis-only, aggression-only cases and children with neither difficulty

In line with the first aim of the current study, precursors to and correlates of psychosis and aggression were compared across the four study groups. Not unexpectedly, co-occurring cases differed significantly on most indicators from children with neither psychosis nor aggression; as a result, this section will focus on contrasts between co-occurring cases and the two 'pure disorder / difficulty' groups. No significant differences were found between co-occurring cases and the psychosis-only or aggressive-only groups in terms of gender, ethnicity or living in urban neighborhoods. Co-occurring cases were comparable to the psychosis-only cases (and differed from the aggressive-only group) in terms of more likely to be bullied, being referred to special education/social services early in childhood, and low birth weight. In line with our previous two studies, co-occurring cases had similar rates of concurrent emotional symptoms (depression and anxiety) as the psychosis-only cases. However, co-occurring cases differed significantly from the psychosis-only cases (and were similar to the aggressive-only cases) in a number of domains: they were more likely to be of lower socio-economic status (as was also reported in study

1), to receive low levels of maternal warmth, and have comparably high rates of chaos in the home as reported by mothers. Across all four ages, the co-occurring group were reported to show similar rates of non-aggressive conduct problems, oppositionality, headstrong traits and irritability to the aggressive-only cases (and significantly higher rates than the psychosis-only group); again, the findings on irritability were comparable to those reported in study 1. Compared to both pure groups, co-occurring cases were significantly more likely to have a low IQ score; poor theory of mind; have both mothers and fathers with antisocial behaviour; and to have suffered from maltreatment. At age 12, co-occurring cases were significantly more likely to self-report chaos in the home and experimenting with/use of cigarettes compared to psychosis-only and aggressive-only cases. Furthermore, looking back to age 5, co-occurring cases were significantly more likely to have internalising problems; higher rates of ADHD symptoms and were less likely to have been seen by teachers as working hard/behaving in school compared to both pure groups.

To assess whether a young person with one pure disorder could go on to develop the other, the second aim of the current study was to assess independent predictors of aggression among children with psychotic symptoms and independent predictors of psychosis among children with aggression. The third aim of the study was to assess independent predictors of co-occurring psychotic symptoms and aggression in the sample as a whole. Details for each of these strands of the current study are discussed below.

Independent predictors of aggression among young people with psychotic symptoms

Independent predictors of aggression (within a group of children with at least one definite psychotic symptom) were poor theory of mind, irritability, father's antisocial

behaviour and maltreatment. Familial antisocial behaviour and maltreatment have consistently been shown to predict aggressive behaviours in a wide range of childhood and adolescent samples (Moffitt & Scott, 2008). Irritability and problems with theory of mind have received less attention in this context. In the current study, our definition of irritability was based on recent work by Stringaris & Goodman (2009b), who found irritability to be associated with both internalising and externalising behaviours. Those authors reported that in cross-sectional data, irritability was associated with both aggressive behaviours and status violations of conduct disorder and suggested the link could reflect reactive behaviours triggered by anger. In addition, irritability as conceptualised as part of a wider syndrome of difficult temperament (consisting of negative emotionality, irritability, or low tolerance to frustration) has been specifically linked to reactive aggression (i.e. a retaliatory response to a real or perceived threat or provocation) as opposed to proactive aggression (i.e. a non-provoked behaviour motivated by the desire for personal gain or the domination of others) (Carrasco Ortiz & del Barrio Gandara, 2006; Merk, 2005; Vitaro et al., 2006; Vitaro et al., 2002). In particular, using a longitudinal population-based study, Vitaro et al. (2006) reported that temperamental irritability assessed during toddlerhood specifically predicted reactive aggression but not proactive aggression at school entry. Similarly, Renouf et al., (2010) reported poor theory of mind to be specifically associated with reactive aggression (and not proactive aggression), especially in children who were frequently victimised by their peers. Studies have consistently highlighted children who lack the skills to consider another person's perspective for decoding social cues rely on their own perceptions of reality, which are based on previous experiences (Runions & Keating 2007). If, however, experiences with others are predominantly negative (such as maltreatment) these children may be especially prone to interpret the situation as threatening and react aggressively (Hughes & Ensor 2006, 2007). Taking all the evidence together, the

associations with irritability and ToM could suggest that children in the co-occurring group might primarily be showing reactive rather than proactive aggression. Further research examining different risk factors specific to reactive and proactive aggression is needed to confirm this possibility.

Independent predictors of psychosis among young people with persistent aggressive behaviour

Within a group of children displaying persistent aggressive behaviour, independent predictors of psychosis were low IQ, internalising problems, educational problems (not hardworking/poor behaviour), ADHD symptoms and maltreatment. Just as with adult onset psychosis, low IQ has been shown to be a risk factor for early onset psychosis (Hollis, 2003, Kumra et al., 2000; Gochman et al., 2005; McClellan et al., 2004). Furthermore, internalising problems and poor behaviour/achievement in school have also been consistently associated with early onset psychosis (Hollis, 1995; Alaghband-Rad et al. 1995; Asarnow et al., 1995). In the Maudsley study, Hollis (1995) reported approximately one third of cases of adolescent schizophrenia had significant difficulties in social development affecting the ability to make and keep friends. Non-specific behavioural changes including social withdrawal, declining school performance, uncharacteristic and odd behaviour began, on average, over a year before the onset of positive psychotic symptoms. In retrospect, it was often apparent that non-specific behavioural changes were frequently early negative symptoms, which in turn had their onset well before positive symptoms such as hallucinations and delusions. In addition, Alaghband-Rad et al. (1995) suggested that childhood-onset schizophrenia in particular may go through a pathway involving a preschool period with nonspecific concerns that there is something wrong, an early

school-age period of nonspecific impairments in attention and behaviour most notably affecting school functioning, followed by the development of psychosis.

The presence of prior ADHD-type symptoms (e.g. attention deficits, hyperactivity, restlessness and impulsivity) and even explicit premorbid diagnoses of ADHD have long been reported for a substantial percentage of children with diagnosable schizophrenia (Russell et al., 1989; Kolvin et al., 1971; Green et al., 1992; Schaeffer & Ross, 2002; Spencer & Campbell, 1994; Alaghband-Rad et al., 1995; Asarnow et al. 1991) and children displaying schizotypal traits (generally accepted as attenuated forms of schizophrenia symptoms and to form similar clusters to overt schizophrenia symptoms) (Venables & Bailes, 1994; Williams, 1994, 1995). Specifically, in a sample of 38 children with child-onset schizophrenia, Green et al. (1992) observed non-psychotic precursors consistent with ADHD, comprising school behavioural problems, hyperactivity, distractibility, increased anxiety, over-sensitivity to discipline, temper tantrums, aggressiveness, and poor peer relationships. The evidence above suggests that ADHD-like behaviours sometimes manifest before the first onset of psychotic symptoms, suggesting phenomenological similarities between ADHD and prodromal schizophrenia. Given that the similarities with ADHD-defined behaviours could confound the early detection of schizophrenia, further research into how to distinguish these disorders would be important to provide the correct treatment.

As well as being an independent predictor of aggression, maltreatment was also an independent predictor of psychosis. This could suggest that maltreatment is a general marker for any future psychopathology and adverse outcomes rather than an exact marker for any one disorder in particular (Lansford et al., 2002). Although there were initial debates over reports of the role of childhood maltreatment in the aetiology of psychosis due to methodological limitations (retrospective reports of trauma, small

samples, heterogeneous diagnostic groups, and lack of control for confounding variables) (Morgan & Fisher, 2007; Bendall et al., 2008), more recent studies have begun to overcome these methodological issues and have still demonstrated an association between childhood maltreatment and psychotic experiences (Fisher et al., 2010; Rubino et al., 2009). Most studies examining this association have focused on childhood adverse experiences and adult psychotic diagnoses/symptoms; to the best of our knowledge, Arseneault et al., (2011), using the sample reported on here, were the first to confirm this association at younger ages. The mechanisms that could explain psychotic symptoms among children who have been maltreated are as yet poorly understood. Two current theories are based on neurodevelopmental alterations and cognitive distortion. Firstly, alterations in the hypothalamic-pituitary-adrenal (HPA) axis are known to be associated with early experience of trauma (Cotter & Pariante, 2002; Heim et al., 2000; Heim et al., 2008) as well as with psychotic illnesses (Mondelli et al., 2009); repeated traumatic experiences could lead to neurodevelopmental changes in the HPA axis, resulting in childhood psychotic symptoms. Secondly, cognitive distortions could occur in children with a history of maltreatment whereby they perceive threat signals where there are none, leading to symptoms of psychosis and more specifically, hallucinations and the development of delusions (Freeman et al., 2002). Further research into these and other mechanisms is still needed.

Independent predictors of co-occurring psychotic symptoms and aggression

Independent predictors of psychosis and co-occurring aggression were low IQ, poor theory of mind, internalising problems, educational problems (not hardworking/poor behaviour), oppositional behaviour and maltreatment. Other than a poor theory of mind, (which as outlined earlier, independently predicted aggression in those with

psychosis), all predictors here are similar to the independent predictors of psychosis in those displaying persistent aggression (with maltreatment predicting both psychosis and aggression separately and in combination). Although collinearity occurred between low IQ and poor theory of mind, both will be discussed here because of their importance in the literatures on risk factors for both psychosis and aggression.

Having already described the significance of each marker of whether a young person with one pure disorder could go on to develop the other, this section will focus on the importance of these characteristics on the development of the combination of psychosis and aggression. References will predominantly be made to studies from the adult literature that have focused on the overlap as evidence within child and adolescent populations are currently limited.

As outlined in chapter two, although mixed, there is some evidence to suggest that individuals displaying both psychosis and co-occurring aggression suffer from a poor theory mind (Abu-Akel & Abushua'leh 2003; Majorek et al., 2009). In particular Weiss et al. (2006) tested emotion recognition abilities in male inpatients with a diagnosis of schizophrenia and found a history of arrest was associated with poor recognition of emotions, most particularly fearful faces. Both the number of arrests for violent crimes and aggressive behaviour were associated with the misinterpretation of faces showing fear or sadness as angry. However given the limited numbers of studies examining impaired theory of mind in aggressive individuals with psychosis there are limits to the conclusions that can be made.

Low IQ is an established risk factor for both schizophrenia (early and adult onset) (Hollis 2003; Cannon et al., 2002a) as well as aggressive behaviour (Farrington &

Hawkins, 1991; Lahey, et al. 1995; Lynam & Henry, 2001). Evidence for IQ as a predictor for both sets of problems is currently limited. Longitudinal prospective investigations have reported that children susceptible to schizophrenia display lower than average IQ scores (as well as motor delays, neurological signs and receptive language deficits) (Cannon et al. 2002a; Cannon & Clarke 2005; Laurens et al. 2007a). One possibility is that these characteristics may limit learning not to be aggressive that occurs from toddlerhood through middle childhood (Broidy et al. 2003). Indirect support for low IQ as a predictor of violence in those with schizophrenia has come from some studies. Walsh et al. (2004) used a clinical sample of patients with schizophrenia and identified special education as a risk factor for violence. Others have suggested obstetric complications may be determinants of later violent criminality in schizophrenia, although more evidence and replication is needed to confirm this (Hodgins et al., 2001).

Adult studies have consistently reported problems in school and education when examining risk factors for those with schizophrenia who display violence. Fazel at el. (2009) linked several nationwide population-based registries in Sweden and followed 13,806 patients with two or more hospitalisations for schizophrenia between 1973 and 2004 and found low educational attainment to be associated with violent offending. Eriksson et al. (2010) found that low marks for conduct in school were associated with serious violent offending in schizophrenia in a large Swedish cohort. Using a large Finnish register-based cohort of individuals with schizophrenia, Cannon et al. (2002) identified poor educational attainment and poor grades for attention in school as childhood risk factors for later criminality and violence in schizophrenia.

These findings are line with previous studies suggesting that patients with schizophrenia and violent propensities are more likely to fail at school (Schanda et al., 1992; Heads & Taylor, 1997). The possible mechanisms whereby this happens

are not clear but are likely to result from a vast array of factors acting either alone or in combination including neurodevelopmental and behavioural problems and social disadvantage, all of which have been linked to the subsequent development of schizophrenia. If it was confirmed that educational difficulties did predict later criminality in individuals with schizophrenia, this subgroup of patients may benefit from targeted risk prevention strategies, especially if identified as being at high risk of developing schizophrenia because of other risk factors such as a family history.

As outlined previously, maltreatment has been associated with psychotic symptoms in childhood (Arseneault et al., 2011) and is a recognised predictor of aggression in children and adolescents (Moffitt & Scott, 2008). Using a clinical sample of inpatients and outpatients with psychotic and mood disorders, Swanson et al. (2002) found that physical abuse occurring before age 16 was associated with a significant increase in the risk of violence. These authors go on to state that the effects of victimisation on violence were found to be highly significant if subjects had experienced repeated physical abuse throughout their lives, with the risk of violence being several times higher in those who were victimised both before and after age 16, compared with those victimised during only one period. Consequently, repeated abuse had a cumulative association with violence. This finding highlights the importance of targeted early intervention for this sub-group (especially if identified as being at high risk of developing schizophrenia) to prevent the long-term complications of violent victimisation, which begin in early life and could remain recurrent in adulthood. Further, Clare et al. 2000 focusing specifically on adolescents with schizophrenia found violence was associated with a history of physical and emotional abuse. These authors found violence to be associated with social factors rather than psychopathology and suggested this provided an opportunity for identifying targets for preventative interventions.

Conduct problems in childhood have been shown to increase the risk for schizophrenia in adulthood (Hodgins et al., 2008; Swanson et al., 2008; Arseneault et al., 2000). Less interest has been paid to oppositionality that may have been present prior to the onset of conduct problems. Given that there is evidence of a linear relationship between oppositionality and conduct problems (Lahey et al., 1997; Loeber, Burke, Lahey et al., 2000), as well as evidence that different aspects of oppositionality could predict both later internalising and externalising behaviours (Stringaris & Goodman 2009a), further investigations into oppositonality (either as a separate grouping of symptoms, as a whole, or in combination with other risk factors) as a predictor of later psychosis and co-occurring aggression could allow for even earlier identification of children at risk of this combination of difficulties.

Not a lot of attention has been focused on internalising problems in childhood and risk for the combination of later violence and schizophrenia. There is evidence to suggest internalising problems are precursors to schizophrenia (Hollis, 1995; Alaghband-Rad et al. 1995; Asarnow et al., 1995), but less is known about their relationship to aggressive behaviour in individuals with psychosis. Given the strength of the independent associations identified in this study and the potential utility of this marker (alongside the other independent predictors) in helping clinicians to identify at-risk children, (and as these are very preliminary analyses) it would be fruitful for future studies to examine this further.

6.4.2 Strengths and limitations of the study

This study was based on a non-referred national community sample, followed from early childhood to age 12 with 96% retention. Psychotic symptoms were assessed by well-trained mental health interviewers in a private interview with each young person

and then reports were reviewed by a panel of experts. Risk factors were assessed prospectively through multiple informants or formal testing of the child using validated measures, independent of the assessment of psychotic symptoms. Due to the wide range of measures available, it was possible to investigate associations that were not feasible to examine in our previous two clinical studies. Along with these advantages, this study also has some methodological limitations. First, the sample studied was comprised of twins and it can therefore not be said with certainty that results generalize to singletons. However, previous comparisons have not found twin to singleton differences in behaviour problems, IQ or personality traits (Gjone & Novik, 1995; van den Oord et al., 1995; Johnson et al., 2002). Nonetheless, replication of findings in studies of singletons would be important. Second, it was not possible to evaluate the role of all important risk factors for schizophrenia, such as delayed motor development. Third, the E-Risk study evaluated only seven positive psychotic symptoms. A more extensive assessment, including negative symptoms and, threat/control-override symptoms, may be advantageous to identify risk factors and correlates that may be specific to particular symptom dimensions. In particular, access to threat/control-override symptoms would allow for investigations into whether or not these particular symptoms independently predict aggression in children with psychotic symptoms over and above the other risk factors examined here. The questions on psychotic symptoms used here, however, are well established and have been validated and used in other studies (Arseneault et al., 2011; Polanczyk et al. 2010; Kelleher et al. 2009). Fourth, the temporal relationship between psychotic symptoms and aggressive behaviour is uncertain as information on psychotic symptoms was not collected prior to age 12. Fifth, although this was a non-referred community sample with a large sample size, future studies would benefit from utilising a nationally representative general population sample.

Conclusion

It was possible to identify co-occurring psychotic symptoms and persistent aggressive behaviour in 12 year old children, in a non-referred national community sample. In this study children in the co-occurring group were similar to psychosis-only cases in terms of concurrent emotional symptoms (depression and anxiety), being bullied, being referred to special education/social services early in childhood, and low birth weight. Co-occurring cases differed from the psychosis-only cases (and were similar to the aggressive-only cases) with respect to lower socio-economic status, low maternal warmth, chaos in the home, non-aggressive conduct problems, oppositionality, headstrong traits and irritability. Compared to both pure groups, co-occurring cases were significantly more likely to have a low IQ score, poor theory of mind, have both mothers and fathers with antisocial behaviour and suffer from maltreatment. In addition, at age 5, co-occurring cases were significantly more likely to have internalising problems; higher rates of ADHD symptoms and were less likely to work hard/behave in school compared to both pure groups. When assessing whether a young person with one pure disorder could develop the other, independent predictors of aggression were found to be poor theory of mind, irritability, father's antisocial behaviour and maltreatment. These could be key features for clinicians to assess in children presenting with psychotic symptoms. Independent predictors of psychosis were low IQ, internalising problems, education (not hardworking/poor behaviour), ADHD symptoms and maltreatment. Clinicians should particularly assess these domains in children displaying persistent aggressive behaviour. Focusing on both sets of difficulties however, it was reported that independent key predictors of co-occurring psychosis and aggression were low IQ, poor theory of mind, internalising problems, not working hard in school/poor behaviour, maltreatment and oppositional behaviour. These in particular, would be key predictors for clinicians to

be aware of for young people at risk of the combination of problems. In the next chapter we will present the overall discussion of the research findings, their implications for research, policy and practice and suggests possible future directions.

Chapter 7

Discussion

7.1 Summary of the thesis

This thesis examined the relationship between psychosis and aggressive behaviour in child and adolescent samples. The overarching aim of the current research was to compare clinical characteristics and associated features in young people with co-occurring psychosis and aggression to those with psychosis or aggression alone. The research described in this thesis is novel and exploratory as studies investigating the area of psychosis and aggression have focused primarily on adults with very little attention having been paid to young people at the time the work began. Given the limited evidence available in child and adolescent populations, the research questions and hypotheses for this research were based on findings from adult studies. With this in mind the primary overarching research question was: *are the risk factors and correlates of co-occurring psychosis and aggression in adolescence similar to or different from those for psychosis or aggression only?* This research question was examined in three separate samples (clinically referred, inpatient and non-referred community). The overarching hypothesis was: *young people with both psychosis and aggression would share risk factors and correlates in common with both 'pure' groups.* Although the overarching research question was the same in all three studies, specific hypotheses were investigated in each of the three empirical studies, as discussed below.

Adult studies in this area have primarily focused on predictors of physical violence in samples with diagnostically defined psychosis (predominantly schizophrenia). This chapter will begin by discussing the definitions of psychosis and aggression applied in the current research. Next, a brief description of each empirical study and its associated hypotheses will be outlined, before the main discussion of the findings of the overarching research question and hypotheses across all three studies; this will also include presentation of a clinical profile of key predictors emerging from this study that may be of use to clinicians considering children at risk of psychosis and co-occurring aggression. Finally, this chapter presents an evaluation of the research methods used in this thesis and discusses implications for future research as well as for policy and practice.

7.1.1 Definition of terms

Psychosis

Studies one and two involved standardised diagnostic definitions of psychosis (based on DSM/ICD). Although the adult literature in this area has focused principally on schizophrenia, the broader category of psychosis was used in the current research because diagnostic instability is known to be marked in childhood and adolescence (McClellan et al., 2002). In study three, where the focus was on 12 year-olds in a community sample, only psychotic symptoms were assessed. Examining psychotic symptoms in childhood should also be valuable in this context, however, as evidence now exists that they represent a developmental risk for adult schizophrenia and may consequently provide an additional framework for investigating aetiological factors for later psychosis. In particular, Poulton et al. (2000) found a strong linear relationship

between self-reported psychotic symptoms in childhood and adult schizophreniform disorder in a longitudinal general population sample. Further, using the data-set reported on here, it has been shown that children in the community self-reporting hallucinations and delusions at age 12 showed many of the same risk factors and correlates as adults with schizophrenia (Polanczyk et al. 2010).

Aggression

As outlined in the introduction, anger, hostility and aggression are central and inter-related concepts of many theories of personality. Howells (1988) described anger as subjective state of emotional arousal, hostility as an attitude or a longer-tem negative evaluation of people or events and aggression as overt behaviour involving harm to another person, but acknowledged that the terms are inter-related. The terms aggression and violence are often used synonymously in adult studies of psychosis and aggression/violence, and although definitions of aggression/violence have varied in the adult literature, many studies have been concerned with physical acts towards others that cause demonstrable harm (Monahan et al., 2001). In keeping with the definitions employed in adult studies, the research described in this thesis also aimed to focus on physical aggression.

In both studies one and two it was possible to focus on physically aggressive acts. In study one the definition included young people rated 'definite' by clinicians on the physically aggressive symptoms of *1)* fighting, bullying, aggression, or *2)* violent assault (stabbing or use of other weapon, severe physical attack). In study two the aggressive group included young people who reported engaging in any of the following from the MCVI tool: i) kicking, biting, choking, ii) hitting, punching someone,

iii) trying to physically force someone to have sex against their will, iv) threatening someone with a knife, gun or other weapon, v) using a weapon on someone, vi) hurting someone so badly they required hospital treatment, vii) any other violent act towards another person. In addition, young people who met criteria for any of the aggressive symptoms of DSM-IV CD [(i) fighting, ii) weapon use, iii) aggressive stealing, iv) forced sex, v) animal cruelty, vi) physically cruelty] were also included.

For study three, a somewhat lower threshold for aggressive behaviours was taken for two reasons. Firstly, given that this study was based on a non-referred community sample of 12 year-olds, it was not expected that high rates of physical aggression would be found. Secondly, measurement of children's behavioural problems in this study was based on the Child Behaviour Checklist (CBCL) (Achenbach, 1991a) which was completed by mothers/main caretakers at ages 5, 7, 10 and 12 years. Although the CBCL includes an empirically derived subscale labelled *aggression,* inspection of the items included in this scale suggested that it included both aggressive items and items often classified as oppositional (e.g. 'argues', 'disobedient'). As the primary interest in the current study was to assess associations between psychotic symptoms and physical aggression, factor analysis was used to derive more homogeneous subscales from the full pool of antisocial items. Using this method, the final definition of aggression included items such as 'cruel or nasty to others', 'bullying or threatening people', 'spiteful, tries to get revenge', as well as items involving physical aggression such as 'gets in many fights', 'physically attacks people', 'hits others with things that could hurt', and 'takes something by force'. The resulting scale showed good internal reliability (α=0.84), but clearly included less severe indicators of aggression than included in the definitions that were possible in studies one and two.

In addition to these definitional issues, the current research was also limited by what was available and possible with respect to overlaps between psychosis and aggression over specific time periods. Study one involved secondary data analysis, which by its nature was constrained by the data collected at the time. Unfortunately, data was not collected on the time period over which the aggressive acts took place, or when a diagnosis was provided. For study two, as I could influence what data was collected, a diagnosis of psychosis related to symptoms evident within three months of when the young person was seen. It was, however, difficult to disentangle current and past episodes of aggressive behaviours due to the long lengths of stay in medium secure units; the constraints of incarceration meant that young people could not engage in behaviours that they had engaged in prior to admission. As a result, aggressive acts were combined into 'ever' classifications. Finally for study three, (also based on secondary data analysis), psychotic symptoms reflected lifetime experiences. Associations between aggression at age 12 and this 'ever' measure of psychotic symptoms fell just short of statistical significance, so a history of past aggressive behaviour was also included in the definition. Future studies focusing on more strict time links between active illness/symptoms and aggression would be useful.

7.1.2 Summary of each empirical study

As reported earlier, the same overarching research question was examined in all three studies. This section will briefly outline each study, recapitulate the specific hypotheses and highlight whether or not they were supported.

Study 1: Clinically referred sample

As described in chapter three, study one involved secondary analysis of a large existing dataset which provided structured data on symptoms, diagnoses, associated psychosocial circumstances and demographic background that has been collected routinely for over 40 years at the Child & Adolescent Department of the Maudsley Hospital. This data-set allowed identification of young people diagnosed with psychotic disorders; those showing evidence of physically aggressive acts; and a co-occurring group with both sets of difficulties. From the limited evidence available at the time this study started it was hypothesised that rates of behavioural problems, substance abuse and exposure to adverse experiences would be higher in the co-occurring group than in psychosis-only cases, and similar to those of aggressive-only cases. As detailed in chapter three, the proposed hypotheses were partly supported, as co-occurring cases resembled aggressive-only cases (and differed from the psychosis-only group) in levels of associated behavioural problems and exposure to some adversities, but predicted group differences in rates of substance use were not confirmed.

Study 2: Inpatient sample

Chapters four and five presented study two, which involved new data collection in inpatient units. Young people admitted to five general adolescent and five medium secure units across England were interviewed using standardised validated measures including a diagnostic tool, with collateral information being obtained from staff and medical notes. Study two enabled us to expand on findings in study one by examining additional features of antisocial behaviours such as callous and

unemotional traits, as well as additional features of psychosis such as threat/control-override (TCO) symptoms. It was hypothesised that co-occurring cases would be similar to aggressive-only cases (and differ from psychosis-only cases) with respect to callous and unemotional traits, non-aggressive antisocial behaviours and levels of victimisation; further, co-occurring cases would have higher rates of TCO symptoms compared with psychosis-only cases. As detailed in chapter five, all these hypotheses were supported.

Study 3: Non-referred community sample

Chapter six described study three, which examined psychotic symptoms and aggression using the prospective Environmental Risk (E-Risk) Longitudinal Twin Study, a non-referred national community sample. Initially, the association between mother-reported aggression at age 12 and self-reported psychotic symptoms was assessed. Although rates of aggression were higher among children with psychotic symptoms, comparisons fell just short of statistical significance. Consequently, indicators of a prior history of aggression at ages 5, 7 and 10 years, as well as aggression at age 12, were used to define aggression. This study included measures of risk factors likely to be specific to psychosis and aggression, as well as a wide range of other potential risk factors and correlates, enabling us to extend the range of predictors assessed in the previous clinical samples. It was hypothesised that the co-occurring group would have higher rates of unfavourable neurodevelopment markers; non-aggressive antisocial behaviours at ages 5, 7, 10 and 12; and exposure to adverse experiences including poor home environments, parental antisocial behaviour and maltreatment compared to the psychosis-only cases, but would not differ from the aggressive-only cases. As detailed in chapter six, the proposed

hypotheses were only partly met; in particular, predicted group differences on certain neurodevelopmental markers (poor theory of mind, low IQ), and particular adverse experiences (maltreatment) were not confirmed, with rates for the co-occurring cases being elevated compared to both pure groups on these indicators.

The next section will focus on the main discussion of the findings of the overarching research question and hypothesis across the three empirical studies.

7.1.3 Summary of the research findings across the three samples

As previously outlined, the overarching research question was: *are the risk factors and correlates of co-occurring psychosis and aggression in adolescence similar to or different from those for psychosis or aggression only?* The overarching hypothesis of this research was that *those with both psychosis and aggression would share risk factors and correlates with both 'pure' groups*. To address this hypothesis, the next section will draw together findings from bivariate analyses in all three studies to explore if co-occurring cases were similar to or different from those with psychosis only / aggression only. The findings are reviewed in relation to three broad groupings of potential risk factors: individual characteristics, family factors and social factors.

Individual factors

Co-occurring cases were contrasted with psychosis-only and aggressive-only cases on a range of individual factors including sex, age, developmental impairments, clinical symptoms, past treatment, other antisocial behaviours and substance abuse. With respect to demographics, in the referred sample co-occurring cases were

similar to psychosis-only cases (and differed from aggressive-only cases) in terms of age and gender. No age or gender differences across groups were found in the inpatient sample, and no gender differences were found across groups in the community sample. Developmental impairment information was not available in the referred sample, and no differences were found between co-occurring and pure groups in the inpatient sample. With further detail on developmental impairment available in the community sample, findings suggested that co-occurring cases resembled psychosis-only cases in having lower birth weights than the aggressive-only group, and were significantly more likely to have a low IQ and poor theory of mind compared to both pure groups.

Information on non-psychotic symptoms was available in all three study samples. Within the referred sample, the analyses suggested that the co-occurring group had most in common with psychosis-only cases; they resembled them (and differed from other aggressive young people) in showing high rates of emotional symptoms, speech and language problems, sleep difficulties and poor concentration. In line with these findings, co-occurring cases in the community sample were comparable to the psychosis-only cases and differed from the aggressive-only cases in having significantly higher rates of depression and anxiety at age 12. Looking back to earlier in childhood, however, co-occurring cases were significantly more likely than both pure groups to have displayed both internalising and ADHD symptoms. In the inpatient sample, group differences in symptom profiles were less marked, probably reflecting the complex symptomotology found in all groups in this sample. Extremely high levels of comorbitiy and complexity are to be expected in a inpatient population. Where there were differences, co-occurring cases were more likely than the psychosis-only group to have higher rates of mania and PTSD symptoms (in line with

aggressive-only cases). With the addition of more detailed information on psychotic symptoms in the inpatient sample, results suggested somewhat higher rates of delusions and significantly higher rates of TCO symptoms among co-occurring cases than in the psychosis-only group. Interestingly, co-occurring cases were significantly more likely to have received prior treatment compared to both pure groups in the referred sample. In a similar way, although not significantly different, co-occurring cases in the community sample had somewhat elevated rates of previous contact with services than either pure group. No such differences were found in the inpatient sample, perhaps again highlighting the complex needs evident in this group. In both clinical samples, co-occurring cases were comparable to the aggressive-only cases in having more longstanding difficulties (duration of any disorder and duration of psychosis) compared to psychosis-only cases.

In all three study groups co-occurring cases were similar to aggressive-only cases in showing elevated rates of non-aggressive antisocial behaviours. Within the referred sample, the co-occurring group had somewhat lower levels of non-aggressive conduct problems than the aggressive-only cases but still markedly higher than those in the psychosis-only group; they were also more likely to have had contacts with the police, and showed elevated rates of irritability. In the inpatient sample rates of suspension/expulsion from school, non-aggressive antisocial behaviour and past offending were comparable to those in the aggressive-only group and significantly higher than among the psychosis-only cases. With the additional markers of callous and unemotional traits available in this sample, findings suggested that co-occurring cases were also significantly more likely to have higher total scores on the Inventory of Callous and Unemotional Traits as well as higher ‘unemotional’ subscale scores than both pure groups. Similar personality traits have been reported in adult studies

of schizophrenia and violence (Cooke & Michie, 2001). Furthermore, co-occurring cases were more likely to have longstanding histories of physical aggression than the aggressive-only group, suggesting that the co-occurring group had displayed aggressive behaviour from relatively young ages. Within the community sample, a similar pattern was found at all four available ages (5, 7, 10 and 12 years): co-occurring cases were comparable to aggressive-only cases, and differed significantly from the psychosis-only group, in having higher rates of non-aggressive conduct problems, oppositionality, irritability and headstrong traits. Further, in this sample, teacher reports at age five suggested co-occurring cases were significantly more likely to misbehave/not work hard in school compared to both pure groups.

A variety of indicators were available on the use/abuse of substances across the three samples. In the community sample, co-occurring cases did not differ from the other groups in terms of alcohol use/experimentation; they were, however significantly more likely than both pure groups to have smoked, with over a third having used/experimented with tobacco by age 12. Rates of cannabis use/experimentation were low in all groups at this young age, and no significant differences were found across groups. In the referred sample, the data recorded reflected substance *abuse;* rates were low overall, and showed no group differences; data on substance *use* may have been more informative in identifying group differences. With more detailed information on substance abuse in the inpatient sample, rates for co-occurring cases were comparable to those in the aggressive-only cases, and significantly higher than in the psychosis-only group.

Family factors

Family factors such as family situation, parenting, family violence and family referrals to social services are known risk factors for/correlates of aggression (see Murray & Farrington, 2010), and family mental illness is a potential risk factor for psychosis (McGuffin et al. 1995). Maltreatment is a potential risk factor for both aggression and psychosis (Moffitt & Scott, 2008; Read et al., 2005).

Group comparisons in these areas highlighted some expected and some less expected patterns. First, no group differences were found in any of the samples in rates of mental disorder in other family members. Given that there are higher rates of schizophrenia among relatives of patients compared to the general population (McGuffin et al. 1995), it had been expected that group differences would be found on this indicator. In the referred and community samples the lack of group differences may reflect the relatively limited measures available. However, even with a more robust data collection method in the inpatient sample (including information from the young person, staff members and medical notes), no differences were found. In a similar way, with regards to family violence, although rates were somewhat elevated for the co-occurring group in the referred sample, no significant group differences were found. Within the inpatient sample the co-occurring group fell in between both pure groups by being significantly more likely than the psychosis-only cases to have violence in the family but significantly less likely than the aggressive-only group. However, within the community sample, young people in the co-occurring group were significantly more likely to have both mothers and fathers displaying antisocial behaviour compared to both pure groups. With respect to family living situation, in both clinical samples young people in the co-occurring group were similar to

aggressive-only cases (and differed from psychosis-only cases) in being more likely to be living apart from family members. In the referred sample in particular, young people in the co-occurring group had higher rates of living in care homes/institutions. In the community sample, they were more likely to be living with a single parent (mother) compared to those in either pure group.

Indicators of parenting were only available in the referred and community samples. The latter sample had available measures of maternal warmth and chaos in the home. Young people in the co-occurring group were similar to the aggressive-only group (and differed from the psychosis-only group) in being rated as receiving low maternal warmth at age five. In addition, whereas young people reported significantly higher rates of chaos at home in the co-occurring group compared to both pure groups, mother reports of chaos at home suggested that co-occurring and aggressively-only cases were comparable in having significantly higher rates than the psychosis-only group. In the referred sample, co-occurring cases were comparable to aggressive-only cases in being more likely than the psychosis-only cases to have overt disturbances of relationships with family members (as well as other adults and children). Interestingly, in this sample, findings suggested that despite their high rates of antisocial behaviour, co-occurring cases were comparable to psychosis-only cases (and differed from aggressive-only cases) in having relatively low levels of difficulty in terms of poor parenting and in particular inadequate parental control.

Indicators of maltreatment were available in all three study samples. In general, the results pointed in the expected direction, although findings were not entirely consistent across the three samples. In the referred sample, recorded rates of abuse were relatively low overall; young people in the co-occurring group did not differ from

those in the psychosis-only group in terms of exposure to abuse, and were significantly less likely to be victims of abuse than those in the aggressive-only group. As noted in chapter three, the low rates recorded in this study may in part have been attributable to the fact that information was obtained at the initial assessment in a clinical setting, where respondents may have been uncomfortable in talking about this issue. In the community sample, rates of maltreatment were significantly elevated for the co-occurring group compared to both pure groups, with maternal reports suggesting that a third of the co-occurring cases had been victims of abuse. Within the inpatient sample co-occurring cases reported similar rates of maltreatment to the aggressive-only cases, and considerably higher rates of victimisation than those in the psychosis-only group. An indicator also likely to be linked to aspects of the family environment was referrals to social services. The clearest information available on this indicator was from the inpatient sample; young people in the co-occurring group were similar to the aggressive-only cases and significantly more likely than the psychosis-only cases to have been referred to social services.

Social factors

Social factors such as ethnicity, urban residence, socio-economic status and exposure to victimisation/bullying have all been associated with both psychosis and aggression in prior studies. In terms of ethnic background, no differences were found across the study groups in the community sample. However, ethnic differences were found in the two clinical samples. Within the referred sample, co-occurring cases resembled the psychosis-only group (and differed from the aggressive-only cases) by being more likely to come from a non-white background. Conversely, in the inpatient sample, co-occurring cases resembled the aggressive-only group (and differed from

the psychosis-only cases) by being more likely to come from a white background. One possible reason for this may have been referral factors in the inpatient units introducing some potential bias, particularly regarding those young people referred for forensic assessment. There was, however, no reason to suspect that the ethnic composition of the inpatient sample reflected any form of selection bias due to selective clinician referrals for this study. Indicators of socio-economic status were only available for the referred and community samples; in both samples co-occurring cases differed significantly from psychosis-only cases and resembled the aggressive-only cases with respect to being of lower socio-economic status. An additional marker of urban residence was available in the community sample, however no group differences were found.

Indicators of peer relationships were only available in the inpatient and community samples. In the community sample co-occurring cases resembled the psychosis-only cases and were significantly more likely than the aggressive-only group to be victims of peer bullying. Within the inpatient sample, alongside peer bullying, a more severe indicator of victimisation was also available. Although no group differences were found in terms of exposure to bullying, young people in the co-occurring group resembled the aggressive-only cases in being considerably more likely to have been victims of aggressive behaviour by others in the last year compared to those in the psychosis-only group.

In summary

Consistent with the overall hypothesis, the bivariate analyses suggested that young people with both psychosis and aggression shared risk factors and correlates with

both ‘pure’ groups. Overall, across the three study samples, findings suggested that co-occurring cases had more in common with aggressive-only cases than with the psychosis-only group. Spanning individual, family and social factors, co-occurring cases resembled aggressive-only cases (and differed from psychosis-only cases) in terms of low socio-economic status, family living situation, disturbances of relationships with family members, levels of non-aggressive antisocial behaviours, oppositionality and irritability, school suspension/expulsion, substance abuse, past offending and contacts with the police as well as the likelihood of being victims of aggressive behaviour. However, co-occurring cases clearly differed from the aggressive-only group (and were similar to the psychosis-only cases) in terms of elevated rates of non-psychotic symptoms including emotional symptoms, speech and language problems, sleep difficulties and poor concentration. Indeed, probably the most salient feature of the co-occurring cases was their high loading of symptoms of all kinds. In addition, co-occurring cases differed from both pure groups on a variety of important markers. As detailed in Table 7.1, across the samples, co-occurring cases had elevated rates of some individual symptoms (both psychotic and non-psychotic), personality traits, developmental impairments, poor behaviour, poor family environment, parental antisocial behaviour and maltreatment. Indicators of this kind may thus be especially characteristic of a subset of young people with psychotic symptoms who are at risk of developing associated aggression; further studies will be needed to confirm this possibility.

Table 7.1: Elevated rates of risk indicators in co-occurring cases compared to both pure both groups within each sample

Referred sample	Inpatient sample	Community sample
Intrusive thoughts	TCO symptoms	Low IQ score
Restlessness	Total ICU scores	Poor theory of mind
Past treatment	ICU unemotional subscale	Internalising problems (age 5)
Depersonalisation / derealisation		ADHD symptoms (age 5)
		Not working hard/misbehaving at school (age 5)
		Maltreatment
		Mothers and fathers with antisocial behaviour
		Self-report chaos in the home (age 12)
		Experiment with/use cigarettes (age 12)

To the best of our knowledge only one previous study has reported on the dual pattern of psychosis and aggression in adolescents. Retrospectively analysing case notes, Clare et al. (2000) compared two groups of 12-18 year-olds admitted to two inpatient units with a diagnosis of psychosis: 14 cases with histories of violent behaviour resulting in police cautions or criminal proceedings and 25 cases with no history of criminal violence. The two groups did not differ on psychopathological variables (including delusions, hallucinations and elevated or fluctuating mood), but violence was associated with exposure to physical and emotional abuse, previous psychiatric and offending histories, and higher rates of contact with social services

and admissions to public care. The authors argued that in adolescence psychosocial problems may be more important than types of symptoms for estimating the risk for violent behaviours. In our research, as outlined earlier, many of the indicators presented are known risk factors for aggressive behaviour in non-disordered samples, and co-occurring cases resembled aggressive-only cases in many of these respects. Clearly, aggression in the co-occurring cases was associated with psychosocial difficulties. However, as well as these difficulties, in our findings, psychotic (as well as non-psychotic) symptoms also contributed to the risk of violence, suggesting that both may play important roles in adolescence as well as in adulthood, again highlighting the high loading of difficulties of all kinds in the co-occurring cases.

7.1.4 Summary of the multivariable analyses findings

As well as the bivariate associations, within the non-referred community sample (study three) it was also possible to use multivariable analyses to investigate, 1) risk factors for young people with one pure disorder developing the other, by assessing independent predictors of aggression among children with psychotic symptoms and independent predictors of psychosis among children with aggression, and 2) independent predictors of co-occurring psychosis and aggression. Full details of the findings of each of these analyses have been discussed in the previous chapter (chapter six) and will be recapped briefly below.

Independent predictors of aggression in those with psychotic symptoms and independent predictors of psychosis in those displaying aggressive behaviour

Independent predictors of aggression (within the group of children with at least one definite psychotic symptom) were poor theory of mind, irritability, father's antisocial behaviour and maltreatment. Familial antisocial behaviour and maltreatment have consistently been shown to predict aggressive behaviours in a wide range of childhood and adolescent samples (Moffitt & Scott, 2008). Irritability and poor theory of mind have received less attention in this domain, but studies have found both markers to be specifically associated with reactive rather than proactive aggression (Stringaris & Goodman 2009b; Vitaro et al., 2006; Renouf et al., 2010). This could suggest that children in the co-occurring group in the community sample were mainly displaying reactive rather than proactive aggression. To our knowledge, studies examining risk factors specific to reactive and proactive aggression have not been undertaken in those with psychosis; our findings suggest that further research in this area would be valuable.

Within the group of children displaying persistent aggressive behaviour, independent predictors of psychosis were low IQ, internalising problems, educational problems (not hardworking/poor behaviour), ADHD symptoms and maltreatment. As with studies of adult onset psychosis, low IQ, internalising problems and poor behaviour/achievement in school have been consistently associated with early onset psychosis (Hollis, 2003; Hollis, 1995; Kumra et al., 2000; Gochman et al., 2005; McClellan et al., 2004; Alaghband-Rad et al. 1995; Asarnow et al., 1995). The presence of prior ADHD-type symptoms (e.g. attention deficits, hyperactivity, restlessness and impulsivity) and even explicit premorbid diagnoses of ADHD have long been reported in a substantial percentage of children with diagnosable

schizophrenia (Russell et al., 1989; Kolvin et al., 1971; Green et al., 1992; Schaeffer & Ross, 2002; Spencer & Campbell, 1994; Alaghband-Rad et al., 1995; Asarnow et al. 1991). In particular, Schaeffer and Ross (2002) found that 47% of children with child-onset schizophrenia had received a prior diagnosis of ADHD, and 77% of those were treated with psychostimulants. These authors speculated that high levels of attentional psychopathology preceding the onset of psychosis resulted in treatment for attention deficits, and exposure to psychostimulants, which increase the release of dopamine within the brain, may have contributed to the childhood-onset psychotic episode. Although further research is needed in this area, other studies have also suggested that stimulant drugs could potentially precipitate or exacerbate psychotic symptoms in schizophrenia, which seems intuitively plausible as antipsychotic agents mostly act to reduce dopamine release within the brain (Cherland & Fitzpatrick, 1999; Opler et al., 2001). The evidence above suggests that ADHD-like behaviours may sometimes manifest before the first onset of psychotic symptoms, suggesting phenomenological similarities between ADHD and prodromal schizophrenia. Thus, the early detection of schizophrenia might be confounded by these similarities with ADHD-defined behaviours. Although the evidence is limited, given the findings that stimulant drugs could potentially precipitate or exacerbate psychotic symptoms, in order to provide accurate treatment, further research into how to distinguish these disorders is important.

Interestingly, as well as being an independent predictor of aggression, maltreatment was also an independent predictor of psychosis. This could suggest that maltreatment is a general marker for any future psychopathology and adverse outcomes rather than a more specific marker for particular disorders (Lansford et al., 2002). Most studies examining the association between maltreatment and psychosis

have focused on childhood adverse experiences and adult psychotic diagnoses/symptoms; so far as we are aware, only one study (also using the sample reported on in chapter six) has examined the association at younger ages (Arseneault et al., 2011). Further research with younger samples, along with studies of the mechanisms that could contribute to elevated rates of psychotic symptoms among children who have been maltreated, is still needed.

Our findings suggest that children presenting to services with psychotic symptoms as well as a poor theory of mind, irritability, father's antisocial behaviour and maltreatment could be at risk of later aggression. Although a great deal more research needs to be conducted, the current findings suggest that these factors should be considered by clinicians when they conduct assessments of the risk of aggression in young people with psychosis. Independent predictors of psychosis were low IQ, internalising problems, problems in school, ADHD symptoms and maltreatment. Clinicians could focus on these domains when they assess children displaying persistent aggressive behaviour, particularly if the young people have other known risk factors for psychosis such as a family history.

Having described the significance of each marker on whether a young person with one pure disorder could go on to develop the other, the next section will focus on the importance of these characteristics for the development of the combination of psychosis and aggression. The focus will predominantly be on comparisons with studies from the adult literature that have focused on the overlap as evidence within child and adolescent populations is currently limited.

Independent predictors of co-occurring psychosis and aggression

As presented in chapter six, independent predictors of psychosis and co-occurring aggression in the full study sample were low IQ, poor theory of mind, internalising problems, educational problems (not hardworking/poor behaviour), oppositional behaviour and maltreatment. Although some collinearity was identified between low IQ and poor theory of mind in the multivariable analyses, both will be discussed here because of their importance in the literature on both psychosis and aggression.

Although there is some evidence to suggest that individuals displaying both psychosis and co-occurring aggression suffer from a poor theory of mind (Abu-Akel & Abushua'leh 2003; Majorek et al., 2009; Weiss et al., 2006), current findings are mixed; this, coupled with the relatively limited number of studies available to date, makes it difficult to draw any firm conclusions. Further research examining impaired theory of mind in aggressive individuals with psychosis is needed.

Low IQ is an established risk factor for both schizophrenia (early and adult onset) (Hollis 2003; Cannon et al., 2002a) and aggressive behaviour (Farrington & Hawkins, 1991; Lahey, et al. 1995; Lynam & Henry, 2001), however evidence for IQ as a predictor for the combined pattern of difficulties is currently limited. Longitudinal prospective investigations have reported that children susceptible to schizophrenia display lower than average IQ scores, as well as motor delays, neurological signs and receptive language deficits (Cannon et al. 2002a; Cannon & Clarke 2005; Laurens et al. 2007a). Walsh et al. (2004) provided indirect support in their clinical sample of patients with schizophrenia where special education was identified as a risk factor for violence.

When examining risk factors for violence among individuals with schizophrenia, problems in school and education are consistently reported in adult studies. Studies have suggested that patients with schizophrenia and violent propensities are more likely to fail at school (Schanda et al., 1992; Heads & Taylor, 1997). In addition, several large-scale population-based registers and birth cohorts have found low educational attainment to be associated with violent offending (Fazel at el. 2009); low marks for conduct in school to be associated with serious violent offending in schizophrenia (Eriksson et al. 2010); and poor educational attainment and poor grades for attention in school as childhood risk factors for later criminality and violence in schizophrenia (Cannon et al. 2002). The possible mechanisms whereby this happens are not clear, but are likely to result from a vast range of factors acting either alone or in combination including neurodevelopmental and behavioural problems and social disadvantage, all of which have been linked to the subsequent development of schizophrenia. If it was confirmed that educational difficulties did predict later criminality in individuals with schizophrenia, this subgroup of patients may benefit from targeted risk prevention strategies.

As highlighted earlier, maltreatment has been associated with psychotic symptoms in childhood (Arseneault et al., 2011) and is an established predictor of aggression in children and adolescents (Moffitt & Scott, 2008). In their clinical sample of patients with psychotic and mood disorders, Swanson et al. (2002) found that the risk of violence was several times higher in those who experienced repeated physical abuse throughout their lives compared with those victimised during only one period, suggesting that repeated abuse had a cumulative association with violence. This finding highlights the importance of targeted early intervention for this sub-group (especially if identified as being at high risk of developing schizophrenia) to prevent

the long-term complications of violent victimisation, which begin in early life and could remain recurrent in adulthood. In addition, focusing specifically on adolescents with schizophrenia, Clare et al. 2000 found violence was associated with a history of physical and emotional abuse. In fact, violence in this sample was associated with social factors rather than psychopathology, which the authors suggested provided an opportunity for identifying targets for preventative interventions.

Although conduct problems in childhood have been shown to be associated with increased risk of schizophrenia in adulthood (Hodgins et al., 2008; Swanson et al., 2008; Arseneault et al., 2000), relatively little attention has been paid to oppositionality, that may be present prior to the onset of conduct problems. Given the evidence of a linear relationship between oppositionality and conduct problems (Lahey et al., 1997; Loeber, Burke, Lahey et al., 2000), as well as recent evidence that different aspects of oppositionality could predict both later internalising and externalising behaviours (Stringaris & Goodman 2009a), further investigations into oppositonality as a predictor of later psychosis and co-occurring aggression could also contribute to early identification of children at risk of this combination of difficulties.

Evidence focusing on internalising problems in childhood as risk factors for the combination of schizophrenia and violence is currently limited. Some studies have identified internalising problems as precursors to schizophrenia (Hollis, 1995; Alaghband-Rad et al. 1995; Asarnow et al., 1995), but less is known about their relationship to aggressive behaviour in individuals with psychosis. Given the strength of the independent associations identified in this study and the potential utility of this

marker (alongside the other independent predictors) in helping clinicians to identify at-risk children, it would appear to be fruitful for future studies to examine this further.

Interestingly, other than a poor theory of mind, (which as outlined earlier, independently predicted aggression in those with psychosis), all predictors for the dual set of problems were similar to independent predictors of psychosis in those displaying persistent aggression (with maltreatment predicting both psychosis and aggression separately and in combination). Further, most independent predictors of psychosis and co-occurring aggression were individual factors; it could be that well-known familial markers for the combination of problems (such as parental antisocial behaviour) appear further down the causal pathway.

Having outlined the findings from both the bivariate and multivariable analyses, the next two sections will discuss these findings in terms of the conceptual implications (linked to models of comorbidity) as well as the clinical implications.

Models of comorbidity – conceptual implications

As outlined in chapter two, Caron & Rutter (1991) suggested four possible explanations for higher than expected levels of comorbidity between disorders. Firstly, one disorder may create an increased risk for another. Secondly, overlapping disorders may share the same risk factor or factors. Thirdly, there may be overlap between risk factors, such that the individual is at risk for two separate conditions with the risk mechanisms for each independent but co-occurring. And finally, the comorbid pattern may constitute a meaningful distinctive syndrome.

With respect to the first explanation, from the research described in this thesis, it is not possible to determine with certainty whether one disorder increased the risk for the other. In line with reports from adult studies, however, we found some pointers both that psychotic symptomotology could increase the risk for aggression and that conduct problems in childhood could increase the risk for psychosis. In the current thesis only the inpatient sample included details on positive psychotic symptoms, including delusional TCO symptoms, suggested to be associated with an increase in the risk of violence in adults with schizophrenia in inpatient samples (see Steinert, 2002). Although rates of TCO symptoms were elevated in co-occurring cases compared to the psychosis-only group in the current study, on further examination, many of the young people displaying TCO symptoms also had histories of conduct problems/aggression, suggesting that the TCO symptoms were not driving the aggression alone. Findings from the inpatient sample (and to some extent from the community sample) also suggested that co-occurring cases had longstanding histories of aggressive behaviours, had high rates of substance abuse and scored high on measures of callous and unemotional traits, all features that adult studies have reported in those adults whose route to psychosis and violence has been linked to childhood conduct problems (Taylor, 2008b). It may be that these young people matched such a profile, although further replication is needed. Further, antisocial youths with callous and unemotional traits have been reported to show deficits in the processing of negative emotional stimuli as well as deficits in their reactivity to signs of fear and distress in others that place young at risk for a particularly severe and long term aggressive pattern of antisocial behaviour (Frick, 2012). It may be possible that a sub-sample of co-occurring cases showing high rates of callous and unemotional traits in the inpatient sample had such deficits, however further research is needed to confirm this possibility. In line with the second comorbidity explanation,

however (and consistent with the overarching research hypothesis), it is reasonable to suggest from the findings reported here that a number of risk factors were shared between psychosis and aggression; whether further risk factors overlapped (in line with the third explanation) is difficult to determine within the current research. Finally, with respect to the fourth explanation, although rates for co-occurring cases were elevated above those for either pure group on a number of indicators (spanning individual, family and social factors) in all three study samples, there was no evidence in the studies reported here for distinct risk factors particular to the dual pattern, making it unlikely that they constitute a separate syndrome.

Clinical implications

While our findings have identified a list of risk indicators that clinicians could think through to identify young people with psychosis who may pose particular risks of physical aggression, the current research suggests that it is a stacking of shared risk factors rather than a distinct set of factors that predispose individuals with psychosis to be aggressive. Table 7.2 presents the independent predictors of psychosis and co-occurring aggression as outlined previously. These key predictors could provide clinicians with cues for identifying children presenting to services who may be at risk of the development of the combination of psychosis and aggression, but a great deal of further research is required before such an approach could be recommended as a standard procedure. While risks of co-occurring psychosis and violence were elevated among young people with these key indicators, it would be important to know how predictive each factor is. For example, although maternal depression, particularly in the postnatal period, is a known risk factor psychopathology and poor developmental outcomes in children, the vast majority of children who grow up with a

depressed mother do not experience poor outcomes (Ramchandani & Murphy, 2013). As noted earlier, given the high loading of different types of difficulties of the co-occurring cases, it seems likely that they may suffer from a stacking of risk factors. In terms of risk assessment for clinicians, it may be possible to develop a checklist to highlight how many of these predictors the young person is presenting with (which could assist with what the next steps should be). For example a young person presenting with one or two markers may simply need to be observed for other changes; whereas a young person presenting with all markers may need to be actively assessed for psychotic symptoms. A great deal of development work would be needed to develop and empirically validate such a scale, given the profound impacts that a label of “high risk of physical violence” may have on the management of a young person already suffering with psychosis. Independent predictors identified in the current research are significant markers; however, there may be other important factors that have not been identified. Consequently, replications in other samples would be necessary to confirm these findings.

Table 7.2: Independent predictors of psychosis and co-occurring aggression within a non-referred community sample

Independent predictors of psychosis and co-occurring aggression
Low IQ score
Poor theory of mind
Internalising problems
Not working hard/misbehaving at school
Maltreatment
Oppositional behaviour

7.2 Evaluation of study methods and approaches

7.2.1 Strengths of the studies

The research in this thesis has a number of important strengths. First, the use of three different types of samples made it possible to examine how far findings replicated across young people examined in different settings. Given the rarity of the issues of interest in the general population, it was important to access clinical samples in order to have sufficient power to identify and explore the characteristics of young people with psychosis and co-occurring aggression. To complement this, the E-Risk sample allowed for exploration of closely related phenomena in a non-referred community sample. Further, analyses of both the inpatient and non-referred community samples were able to build on preceding analyses to address certain limitations and allow further assessment into different important areas. For example, the inpatient study enabled more detailed examination of psychotic symptomotology as well as callous and unemotional traits. Additionally, the E-Risk dataset enabled exploration of psychotic symptoms in community samples, attracting increasing attention due to their developmental risk for adult schizophrenia (Poulton et al. 2000) and their relationship with aggressive behaviour in adult studies (Mojtabai, 2006), as well as identification of early risk factors and independent predictors of aggression and psychotic symptoms. Second, all three studies included measures relating to individual characteristics of the children, their families, and wider social contexts. This made it possible to take a broad-ranging approach to identifying potential risk factors for psychosis and aggression relating to different levels of influence, including both proximal and more distal risks. Third, in the inpatient study, symptoms were assessed via a standardised diagnostic tool by trained interviewers (three of whom

were child and adolescent psychiatrists), with good to excellent inter-rater reliability. Validated tools were also used to measure aggressive behaviour and callous and unemotional traits. The E-Risk dataset included a range of well-validated standardised measures, and in the referred sample item sheet ratings have shown satisfactory levels of reliability and have been informative in previous studies of psychosis in children and adolescents (Hollis, 2000; Cannon et al., 2001). Fourth, in the inpatient study, as well as young people's reports, information was triangulated by obtaining collateral information from medical notes and staff reports. For the E-Risk study, data was collected from multiple informants including mothers, children and teachers. Such multi-informant, multi-measurement approaches strengthen the validity of the findings and reduce the likelihood of error arising from shared method variance. Fifth, the longitudinal, prospective nature of the E-Risk dataset allowed identification of early risk factors and enabled multivariate analyses which identified independent predictors of psychosis and aggression. Finally, despite the moderate sample size of the inpatient study, all three samples provided adequate statistical power to investigate the main questions of interest.

7.2.2 Limitations of the studies

Alongside the strengths outlined above, the studies presented in this thesis have some methodological limitations. General limitations are discussed in the following section, specific limitations pertaining to each study can be found in the relevant discussion sections in chapters three to six. First, in defining psychosis, diagnoses of affective as well as non-affective psychoses were included. Adult studies in this area have predominantly focused on schizophrenia; as outlined earlier however, previous studies have also noted a lack of diagnostic stability in child and adolescent samples

(McClellan et al., 2002), and in our own clinical samples, levels of overlap with aggression were very similar in those with and without affective symptoms. Replications in more specifically-defined samples would nonetheless be valuable. In addition, our focus on diagnostically-defined groups in the clinical samples inevitably meant that those who might have been in the prodromal stage were not included; although inclusion of groups of this kind would have increased Ns, there was also a risk of diluting the sample. Future research could explore the issue of aggression among those in the prodromal stage, both in terms of the risk of ongoing aggression but also in terms of risks of progression to frank psychosis, to which some of the predictors of the co-occurring group for psychosis may predispose. Furthermore, as outlined in chapter five, although agreement between research interviews and diagnostic information derived from medical notes was generally high in the inpatient sample, one sub-group of aggressive young people recorded as meeting diagnostic criteria for psychosis in the research interviews received different diagnoses (most often of emerging personality disorder) from unit staff, with their symptoms either recorded as pseudo-hallucinations linked to trauma, or as not severe enough to warrant a diagnosis. Further research could attempt to unpick which factors might predispose a young person to have reports of hallucinations classified as true or pseudo-hallucinations in different circumstances. As discussed in chapter two, high levels of comorbidity between psychosis and personality disorders have consistently been reported in adult samples (Newton-Howes et al, 2008); our findings suggest that it would also be of value to examine overlaps of this kind in more detail at younger ages.

Second, in the referred sample, although the samples had adequate power to detect differences between the three selected groups in the majority of the analyses, power

was reduced to some extent in analyses based on the subset of variables only recorded for more recent cases. As a consequence, there are limits to the conclusions that can be drawn on these specific variables. Furthermore, in both clinical studies, the Ns available precluded multivariate analyses, which would have been a valuable approach to highlight key independent predictors of group differences.

Third, in the inpatient study information on past episodes and exposures relied on retrospective (i.e. “ever”) reports. Retrospective recall may be subject to error as participants may forget specific events, particularly those that occurred many years previously or that occurred when respondents were young, and confusion may arise over the timing of events (Henry et al., 1994; Ross, 1989; Squire, 1989). To minimise the impact of recall bias in the inpatient study, information from medical notes/staff was used in conjunction with interview data as much as possible. It was not feasible to include parents/carers as additional informants, but they would undoubtedly provide a further useful source of information in future studies.

Fourth, because both clinical samples were cross-sectional, and information on psychotic symptoms was only collected at age 12 in the E-Risk sample, the ordering of onset of psychosis and aggressive behaviour in the co-occurring cases could not be determined. Fifth, although E-Risk is a non-referred community sample, future studies would benefit from utilising a nationally representative general population sample, where findings could be generalised to a wider population. Finally, in all three studies, although findings were informative about associations between variables, they could not address the underlying causal mechanisms. It remains a possibility that observed associations reflect other unmeasured confounding

variables. In particular, there is a possibility that observed associations may reflect genetic confounding, given findings of strong genetic influence on both psychosis and aggression, and the fact that parents pass on both genes and environments to their children. Genetically informative designs would be needed to test this out.

7.3 Implications for future research

The work presented in this thesis suggests a number of areas that future research could focus on. First, future studies in adolescent samples should focus on specific clusters of psychotic symptoms. Specifically, delusions have been associated with violence in adult samples (Taylor, 1985; Taylor et al., 1998; Junginger, 1996, 2006). A better understanding of violence driven by psychotic symptoms at younger ages could help identify individuals at risk for violence more accurately. Second, aggression in those with psychosis is clearly heterogeneous; more refined measurement of aggression would enhance our understanding of distinctions between proactive and reactive aggression. It is probable that some types of violence (predatory, proactive violence against strangers) are not frequently committed by individuals with psychosis but that other types (reactive violence against family members or peers following stressful or tense encounters) may be. Our own research pointed to impaired theory of mind as an independent predictor of aggression in those with psychosis and as an independent predictor of psychosis and co-occurring aggression; this in turn has been associated with reactive rather than proactive aggressive behaviour. This could be particularly potent in children reacting violently not only to family members but also to peers in school, leading to further potential difficulties such as peer victimisation and / or harsh responses by adults. Third, longitudinal research is well suited to identifying the possible connections

between elements of psychosis and aggression across time. Within general population samples it would be particularly interesting to track progressions from psychotic symptoms to first onset of psychosis *alongside* the development of associated aggression. Fourth, future studies must consider clinical, demographic, and contextual variables. It was clear from the research reported in this thesis that individual, familial and social indicators were all important risk factors. Additional studies focusing on possible mediating mechanisms are necessary. Indeed, when examining whether individuals with psychosis are likely to be aggressive, Douglas, Guy and Hart (2009), have suggested a more complex and sophisticated question to examine could be, "What particular symptoms of psychosis, under which situational circumstances, and in combination with which personal or situational factors are associated with increased or decreased risk of various kinds of violence?" (page 696).

7.4 Implications for policy and practice

From the findings presented here, and the clear overlap with findings from many adult studies reporting on the same phenomena, it is clear that risk assessment for young people should be similar to that for adults, and perhaps could be extended. In addition, given the high-risk nature of those presenting with both sets of difficulties, it would be necessary that these young people are appropriately placed. In the inpatient study, higher rates of co-occurring psychosis and aggression were found in the medium secure units than the general adolescent units, suggesting that these cases were being filtered and receiving the appropriate care. An important finding across samples in this research was that young people displaying both psychosis and aggression were more likely to have had prior contact with services earlier than

those with either 'pure' difficulty. This raises the issue of early detection and intervention, although a great deal of further research is required before a systematic approach to the prediction of violence and / or psychosis amongst young children in contact with mental health services can be recommended. In extending risk assessment with young people (and perhaps even with adults), psychosis/psychotic symptoms should be actively assessed and evaluated in violence risk assessments. In this research, independent predictors of the co-occurrence were poor theory of mind, low IQ, internalising problems, maltreatment, not working hard/misbehaving at school and oppositional behaviour. It may eventually be possible to develop a checklist for use by clinicians that measures how many of these predictors a young person is presenting, that could be linked with guidance on how to minimise detected risks (for example, there may be a "tipping point" at which the number of risk factors or a particular constellation of risks combine to indicate a much more significant level of risk of violence). In contrast, a person presenting with one or two markers may simply need to be observed for other changes, whereas a young person presenting with all markers may need to be actively assessed for hallucinations and delusions. Specifically, interventions focused on childhood psychotic symptoms could prove to be important in preventing long-term adverse outcomes.

Conclusions

Studies focusing on young people who suffer from a dual pattern of co-occurring aggression and diagnostically defined psychosis are rare. Given the adverse long-term outcomes, costs to society and the individual stigma of both psychosis and aggressive behaviour, identifying risk factors for children and adolescents in this group is an important area of research. Utilising clinical and non-referred community

samples, the findings from the research presented in this thesis demonstrate that it is possible to identify co-occurring psychosis and aggressive behaviour in child and adolescent samples. In line with adult studies, this research has found parental antisocial behaviour, high rates of past offending, TCO symptoms and high levels of callous and unemotional traits to be associated with co-occurring cases. Further, independent predictors of psychosis and co-occurring aggression were low IQ, poor theory of mind, internalising problems, maltreatment, poor educational attainment and oppositional behaviour. These findings have important clinical implications for both adult and child and adolescent services, with a possible opportunity to identify those at risk of this dual pattern of difficulties. Early markers identified here, if replicated, could inform risk assessment as well as prevention and early intervention strategies to reduce aggression among individuals with psychosis.

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Appendices

Appendix 3.1 presents a copy of the Item Sheet as discussed in chapter three.

Appendix 4.1 presents copies of the information sheets and consent forms for young people who participated in the inpatient study as described in chapter four.

Appendix 4.2 presents questions specific to psychosis and conduct disorder as described the K-SADS PL screen and supplement section that were used in the inpatient study (chapter four).

Appendix 4.3 presents a proforma designed specifically for use in the inpatient study to extract information from medical notes (chapter four).

Appendix 5.1 presents additional analyses from chapter five describing group contrasts within unit type – general adolescent and medium secure (Tables 5.14 – 5.18). To ensure that group contrasts were not simply a function of unit type variations, analyses were repeated separately for young people in general and medium secure units (simply including unit type as a covariate in the analyses was not feasible as there were only three psychosis-only cases in the medium secure units). Group differences found in the full sample were largely borne out within each type of setting, with only few exceptions. Certain previously statistically significant differences between the co-occurring and psychosis-only groups did not remain on the following correlates (ethnicity, parental status, forensic history, alcohol & drug

abuse and current manic and PTSD symptoms), possibly due to limited power. In each case, however, rates remained elevated for the co-occurring group compared to the psychosis-only cases, consistent with analyses for the full sample. Similarly, although statistical tests were not feasible in the co-occurring vs. aggressive only contrasts, the pattern of findings (with respect to rates) was generally similar to that found in the full sample.

Appendix 3.1 – Maudsley Item Sheet

CHILDREN AND ADOLESCENTS' DEPARTMENT

ITEM SHEET – PART ONE

This section to be filled in by Registry Clerk

Hospital No: | | | | | | | | | | |

Child's Name: .....

Ethnicity (as and if described by respondent on 'Ethnicity Classification Categories and Codes') | |

Parents Occupation ..... | |

Physician or other staff member in charge of case ..... | |

Name of person completing Item Sheet .....

Date of registration | | | | |
M M Y Y

Has the case been opened before? | | | (If so, the original case number should be used)
Y N

Date of referral .....
(i.e. time or receipt of first referral letter, or first contact if self referred)

CONSENT

I agree to this information being kept confidentially on a computer and understand that it may be used for research

YES ☐ NO ☐ **Signature:**

I agree to being contacted in the future if selected for an independently approved research study on the basis that I will be free to agree or refuse

YES ☐ NO ☐

Name: **Signature:**

Date:

INSTRUCTIONS ON USE OF THE ITEM SHEET

This Item Sheet must be completed for all patients seen in the Children's Department (including emergency referrals and all re-referrals, i.e. cases previously registered and closed). It aims to provide a summary of some of the chief aspects of diagnosis, symptomatology and treatment in order to select cases for research purposes and to review the work of the department.

The diagnostic scheme with which the Item Sheet should be used is based on the 10th Revision of the International Classification of Diseases, but it differs in being placed within the structure of a multiaxial framework. The full manual is available in the Children's Registry; and copies are distributed to registrars and permanent staff..

PART ONE - Should be completed **WITHIN TWO WEEKS** of child's first attendance and returned to Registry

PART TWO - Should be completed at the time of **CLOSURE OR** during the **SEPTEMER** or **MARCH** following Registration, whichever is earlier

PART THREE - Should be completed at the time of **CLOSURE**

The Specialist Registrar, Consultant or Staff Psychologist will be responsible for checking the Item Sheets. Any difficulties should be referred to Professor Patrick Bolton.

RECORD 1

AGE
(in years according to child's last birthday) ☐☐ SEX Male ☐ Female ☐

DIAGNOSIS (Use Manual to make Diagnostic Classification)

AXIS ONE F ☐☐☐

Clinical Psychiatric Syndrome (1) ☐☐☐ (2) ☐☐☐

(3) ☐☐☐

(make one diagnosis only if possible – the second and third are intended for cases where a clearly separate condition arises)

AXIS TWO F ☐☐☐
Developmental Disorder

AXIS THREE F ☐☐☐
Intellectual Level

AXIS FOUR Medical Conditions (write in, do not code)

1. ☐☐☐☐

2. ☐☐☐☐

SEVERITY OF SOCIAL IMPAIRMENT ☐

SYMPTOMS OR SIGNS IN THE LAST YEAR
(For this purpose assess on the basis of both the history from child or parent *and* observed abnormali

NP = Not Present **D** = Dubious Minimal **DP** = Definitely Present **NK** = Not Known

PLEAST PUT AN X IN THE BOX WHICH APPLIES [X]

Emotional Symptoms	**NP**	**D/M**	**DP**	**N/K**
Abnormal suspiciousness or 'sensitivity'	☐	☐	☐	☐
Morbid anxiety, worry or panic	☐	☐	☐	☐
Morbid depression, sadness, unhappiness, tearfulness	☐	☐	☐	☐
Guilt, self-blame, ideas of hopelessness and other depressive-type cognitions	☐	☐	☐	☐
Situation or object specific fears or phobias	☐	☐	☐	☐

	NP	D/M	DP	N/K
Ruminations, obsessions, rituals or compulsions (do not include faddiness, rigidity or other obsessive traits)	☐	☐	☐	☐
Suicidal ideas, attempt or threat	☐	☐	☐	☐
Hypochondriasis	☐	☐	☐	☐
Morbid irritability, screaming, tempers, breath-holding attacks	☐	☐	☐	☐
School refusal, or phobia or crying on arrival at school	☐	☐	☐	☐
Abnormally elevated mood (including hypomania)	☐	☐	☐	☐
Depersonalisation or derealisation	☐	☐	☐	☐
'Conversion' hysterical symptoms (do not include histrionic behaviour)	☐	☐	☐	☐
Intrusive thoughts	☐	☐	☐	☐
Somatic	**NP**	**D/M**	**DP**	**NK**
Anorexia (including reduced appetite and refusal to eat, but not loss of appetite if due wholly to physical illness)	☐	☐	☐	☐
Other disturbance of eating (pica, abnormal faddiness, bulimia, etc)	☐	☐	☐	☐
Insomnia (including all forms of reduction in sleep)	☐	☐	☐	☐
Other disturbance of sleeping (hypersomnia, nightmares, sleepwalking, etc)	☐	☐	☐	☐
Pains of mental origin (headache, backache, abdominal pains, nausea, leg pains)	☐	☐	☐	☐
Encopresis or faecal soiling	☐	☐	☐	☐
Enuresis (nocturnal or diurnal or both)	☐	☐	☐	☐

Disturbance of Relationships

(for these codings the disorder must involve the child as an active agent not just as a recipient. Thus, either a disorder of relationships stemming from the child or an abnormal dyad would be included but abnormal parental behaviour would not if the child's response were appropriate)

	NP	D/M	DP	NK
No such relationships (e.g. no siblings)	☐	☐	☐	☐
Overt disturbance of child-mother relationship (including hostility, dependency, etc)	☐	☐	☐	☐
Overt disturbance of child-father relationship	☐	☐	☐	☐
Overt disturbance of relationship with other adults (e.g. school teacher)	☐	☐	☐	☐

	NP	D/M	DP	NK
Overt disturbance of patient-sib relationship (including morbid rivalry or jealousy)	☐	☐	☐	☐
Overt disturbance of relationships with other children (including isolation, failure to make friends, etc)	☐	☐	☐	☐
Autistic-type disturbance of social interaction/relationships	☐	☐	☐	☐
Socially disinhibited	☐	☐	☐	☐

Speech and Language

	NP	D/M	D/P	NK
Disorder of rhythm (e.g. stuttering)	☐	☐	☐	☐
Disorder of articulation	☐	☐	☐	☐
Disorder of comprehension of spoken language	☐	☐	☐	☐
Disorder of production of spoken language (including simple retardation of language development)	☐	☐	☐	☐
Impaired use of language for social communication	☐	☐	☐	☐
Elective Mutism	☐	☐	☐	☐
Abnormal language features (delayed echolalia, neologisms etc, but not including simple immediate echolalia)	☐	☐	☐	☐

Motor	NP	D/M	DP	NK
Tics	☐	☐	☐	☐
Other abnormal repetitive movement (whirling, flapping twisting of hands, etc)	☐	☐	☐	☐
Stereotyped, complex behaviour (e.g. repetitive lining up Of objects, abnormal circumscribed interest patterns)	☐	☐	☐	☐
Clumsiness and poor co-ordination	☐	☐	☐	☐
Restlessness or fidgetiness	☐	☐	☐	☐
Gross overactivity	☐	☐	☐	☐
Psychomotor retardation	☐	☐	☐	☐
Habitual manipulations, eg thumb sucking, tongue sucking, rocking, masturbation, nail biting, scratching, head banging etc.	☐	☐	☐	☐
Antisocial behaviour or Abnormal of Conduct	**NP**	**D/M**	**DP**	**NK**
Defiance (active or passive) or lying	☐	☐	☐	☐
Stealing	☐	☐	☐	☐
Destructiveness or malicious damage	☐	☐	☐	☐

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	NP	D/M	DP	NK
Truancy or staying out late	☐	☐	☐	☐
Running or wandering away from home	☐	☐	☐	☐
Sexual misbehaviour (assault, exposure, etc)	☐	☐	☐	☐
Fighting, bullying, aggression, etc	☐	☐	☐	☐
Violent assault (stabbing or use of other weapon or corrosives, severe physical attack etc	☐	☐	☐	☐
Taking drugs	☐	☐	☐	☐
Substance abuse other than drugs (alcohol, solvents)	☐	☐	☐	☐
Cruelty to animals	☐	☐	☐	☐
Fire setting	☐	☐	☐	☐
Other antisocial behaviour (raising fire alarms etc)	☐	☐	☐	☐
Other symptoms in the last year	**NP**	**D/M**	**DP**	**NK**
Disorder of gender identity	☐	☐	☐	☐
Impaired concentration (including short attention span, marked distractibility)	☐	☐	☐	☐
Hallucinations, delusions, ideas of reference, or morbid persecutory ideas	☐	☐	☐	☐
Markedly impulsive behaviour	☐	☐	☐	☐
Self-injury, other than suicidal attempt (e.g. wrist-biting)	☐	☐	☐	☐

Abuse of Child	**NP**	**D/M**	**DP**	**NK**
Physical abuse in the last year	☐	☐	☐	☐
Physical abuse previously	☐	☐	☐	☐
Sexual abuse in the last year	☐	☐	☐	☐
Sexual abuse previously	☐	☐	☐	☐

Where seen for <u>initial</u> assessment (please X one box only)

Bethlem	☐	Brixton CGC	☐	Camberwell CGU	☐
Kings/Belgrave	☐	Maudsley	☐	Elsewhere	☐

Difficulties in Coding Diagnosis None ☐ Yes ☐

Specify difficulties

Has the patient been entered as a subject in a research project approved by the Ethics Committee?

Yes ☐ No ☐

Main referral agency (please X one box only)

Main referral agency (please X one box only)

General Practitioner	☐	Social Services	☐
Probation Service, Remand Home, Solicitor, Court (or any source for Court report)	☐	Child, Parent or Guardian (Directly	☐
Local Education Authority, School, School Medical Office, Education & Welfare Office	☐	Paediatrician	☐
Psychiatrist treating other family member	☐	Psychiatrist treating child elsewhere	☐
Other -- including voluntary organisations	☐	Not known	☐

Duration of Child's Psychiatric Disorder

(For this purpose measure duration according to the presence of clinically significant disorder. ***DO NOT*** include personality traits without significant disorder in this connection. When there is intellectual or educational retardation, code on the duration of the psychiatric disturbance and not the retardation as such. The time of first parental concern is irrelevant).

Six months or less	☐	More than six months but less than one year	☐
1 year or more but less than 2 years	☐	Two years or more but less than three years	☐
Three years or more	☐	No psychiatric disorder	☐
Not known	☐		

Patient Status (at time of initial assessment)

Routine Out-patient (Case Conference)	☐
Routine Out-patient (non-Case Conference, trainee)	☐
Routine Out-patient (non-Case Conference, staff member)	☐
Emergency O.P. (i.e. case seen within 24 hours regardless of whether psychiatrist regards case as psychiatric emergency)	☐
Day Patient	☐
In-patient	☐

School (at which child registered at time of registration)

Not at school (any age)	☐	Day school (any type)	☐
Day nursery, playgroup or nursery school (any age)	☐	Weekly boarding (any type)	☐
Full boarding (any type)	☐	Not known	☐

Special School, Unit or Day Nursery (at which child registered at time of registration. Please X one box only)

Not at special school	☐
Special school or unit for physical handicap (including schools for epilepsy, cerebral palsy or deaf or blind children)	☐
Special school or unit for 'delicate' children	☐
Special school or unit for mild or moderate mental handicap	☐
Special school or unit for severe mental handicap	☐
Special school or unit for specific educational difficulty e.g. dyslexia, or language unit	☐
Special school or unit for emotional or behavioural problems (include school for maladjusted or delinquent)	☐
Special school or unit for autism or communication disorder	☐
Other (e.g. unit for a mixed group of children with developmental problems	☐
Not known	☐

Special Educational Needs (please X one box only)

No special needs recognised by educational authority	☐
Statement of needs is being made, but not completed	☐
Statement of needs maintained but no provision made	☐
Statement of needs maintained and some provision made (e.g. extra teacher time)	☐

Employment (please X one only)

Not yet left school	☐
Left school and in further education	☐
Left school but currently unemployed	☐
Left school and currently in sheltered employment	☐
Left school and in youth training (or similar) scheme	☐

Currently in regular employment ☐ Other ☐ Not known ☐

Legal Status (Please X one box only)

No special status	☐	In care to local authority, no order	☐
Adopted, by relative	☐	Adopted, by unrelated family	☐
Subject to supervision order	☐	Subject to care order	☐
Remanded into care	☐	Subject to EPO or interim care order	☐
On bail	☐	Other	☐

Current Parental Situation (Please X one box only)

Child living with two natural or adoptive parents	☐
With mother alone	☐
With father alone	☐
With mother and other (e.g. step-father)	☐
With father and other (e.g. step-mother)	☐
With neither parent but with relatives	☐
With foster parents or other non-relative	☐
In Children's Home or any other type of institution	☐
Other (including living independently away from parents)	☐
Not known	☐
No. of Children under 17 years in Household (irrespective of relationships but including patient)	☐☐
Not known	☐
Child in Institution	☐

Ordinal Position (Please X one box only)
(household in which child is resident)

Only child	☐	Eldest child	☐	Youngest child	☐
Middle or other position (include one of a set of multiple births)	☐				

Sexual Maturity (Please **X** one box only)

Pre-pubertal ☐

Any sign of beginning adult sexual development (breast development, pubic, axillary or facial hair development; enlargement of genitalia; or 'breaking' of the voice) ☐

Pubertal:-

Girls - menstruation has occurred ☐

Boys - either emission has occurred or equivalent maturity judged on basis of development of sexual hair and genitals ☐

Not known ☐

Twin (Please **X** one box only)

No	☐	Yes: twin dead	☐
Yes: not known if twin alive	☐	Yes: Monozygotic	☐
Yes: Dizygotic, same sex	☐	Yes: Dizygotic, opposite sex	☐
Triplet or otherwise one	☐	Not known if twin, triplet, etc of a set of multiple births	☐

Past History

Attended psychiatrist, psychologist or PSW on previous occasion

No	☐	Not known	☐
Yes	☐		

Attended paediatrician for enuresis, encopresis or any disorder of behaviour or emotions

No	☐	Yes for definite psychiatric disorder	☐
Yes, possible psychiatric disorder (psychosomatic or isolated developmental disorder)	☐	Not known	☐

Brought before Juvenille Court at any time

No	☐	No, but has had a police caution	☐
Yes, only once	☐	Yes, two or more times	☐
Not known	☐		

Place of Residence – (Records Officer to identify area please X one box only)

South Southwark	☐	East Lambeth	☐
Southwark (Other)	☐	Lambeth (other) or Lewisham	☐
Greater London (other than above)	☐	England, Wales, Scotland	☐
Home Counties	☐	Northern Ireland or Eire	☐
Elsewhere	☐	Not known	☐

Family History Country of Birth Mother (Please X one box only)

England, Scotland, Wales	☐	West Indies (including Guyana)	☐
Northern Ireland or Eire	☐	Africa (excluding South Africa)	☐
Cyprus, Turkey, Greece	☐	Asia	☐
Other European Country	☐	Other	☐
Not known	☐	N Zealand, Australia, Canada, USA, S Africa	☐

Country of birth of Father

England, Scotland, Wales	☐	West Indies (including Guyana)	☐
Northern Ireland or Eire	☐	Africa (excluding South Africa)	☐
Cyprus, Turkey, Greece	☐	Asia	☐
Other European Country	☐	Other	☐
Not known	☐	N Zealand, Australia, Canada, USA, S Africa	☐

Country of birth of Child

England, Scotland, Wales	☐	West Indies (including Guyana)	☐
Northern Ireland or Eire	☐	Africa (excluding South Africa)	☐
Cyprus, Turkey, Greece	☐	Asia	☐
Other European Country	☐	Other	☐
Not known	☐	N Zealand, Australia, Canada, USA, S Africa	☐

For the following items 'Parent' refers to the person who is acting as a parent to the child irrespective of whether there is any blood relationship.

Has a parent of sibling committed suicide or attended a psychiatrist (OP or IP) at or before the age of 16 years ☐

Has parent or sibling committed suicide or attended a psychiatrist at or after the age of 17 years ☐

Clinical Responsibility (Bethlem, Maudsley or Camberwell)

Bernard	☐	Bolton P	☐	Bolton D	☐
Byrne	☐	Goodman	☐	Jacobs	☐
Misch	☐	Heyman	☐	Scott	☐
Simonoff	☐	Taylor	☐	Weeramanthri	☐
Yule	☐	Other staff member	☐	Not assigned	☐

Other Consultant Psychiatrist ☐

Clinical Responsibility (King's or Brixton)

Nikapota	☐	Mohammad	☐	Lax-Pericall	☐

Is this a re-attendance
(i.e. has case been previously registered and closed)

Yes	No
☐	☐

Associated Abnormal Psychosocial Situations (Please X one box only)
Is any abnormal psychosocial situation present?

KEY
NP = Not Present **D** = Dubious Minimal **DP** = Definitely Present **NK** = Not Known

PLEASE PUT AN X IN THE BOX WHICH APPLIES | X |

Abnormal intrafamilial relationships	NP	D	DP	NK
Lack of warmth in parent-child relationship	☐	☐	☐	☐
Intrafamilial discord among adults	☐	☐	☐	☐
Hostility towards or scapegoating of the child	☐	☐	☐	☐
Physical child abuse	☐	☐	☐	☐
Sexual abuse (within the family)	☐	☐	☐	☐

Other

Mental disorder, deviance or handicap in the child's primary support group	NP	D	DP	NK
Parental mental disorder/deviance	☐	☐	☐	☐
Parental handicap/disability	☐	☐	☐	☐
Disability in sibling	☐	☐	☐	☐

Other

Inadequate or distorted intrafamilial communication	☐	☐	☐	☐

Abnormal qualities of upbringing	NP	D	DP	NK
Parental overprotection	☐	☐	☐	☐
Inadequate parental supervision/control	☐	☐	☐	☐
Experiential privation	☐	☐	☐	☐
Inappropriate parental pressures	☐	☐	☐	☐

Other

Abnormal immediate environment	NP	D	DP	NK
Institutional upbringing	☐	☐	☐	☐
Anomalous parenting situation	☐	☐	☐	☐
Isolated family	☐	☐	☐	☐
Living conditions that create a potentially hazardous psychosocial situation	☐	☐	☐	☐

Other

Acute life events	NP	D	DP	NK
Loss of a love relationship	☐	☐	☐	☐
Removals from home carrying significant contextual threat	☐	☐	☐	☐
Negatively altered pattern of family relationships	☐	☐	☐	☐
Events resulting in loss of self esteem	☐	☐	☐	☐
Sexual abuse (extrafamilial)	☐	☐	☐	☐
Personal frightening experience	☐	☐	☐	☐

Other

Social Stressors	NP	D	DP	NK
Persecution or adverse discrimination	☐	☐	☐	☐
Migration or social transplantation	☐	☐	☐	☐

Other

Chronic interpersonal stress associated with schoolwork	NP	D	DP	NK
Discordant relationships with peers	☐	☐	☐	☐
Scapegoating of child by teachers or work supervisors	☐	☐	☐	☐
Unrest in the school/work situation	☐	☐	☐	☐

Other

Stressful events/situations resulting from the child's own disorder/disability	NP	D	DP	NK
Institutional upbringing	☐	☐	☐	☐
Removal from home carrying significant contextual threat	☐	☐	☐	☐
Events resulting in loss of self esteem	☐	☐	☐	☐

Other

THANK YOU

Please check all sections have been completed and hand PART 1 to Registry staff

(If appropriate please check with supervisor before handing in)

Appendix 4.1 – Information sheet and consent forms

Institute of Psychia
at The Maudsley

KING'S College LONDON
University of London

ADOLESCENT INPATIENT CARE EVALUATION

CCQI
COLLEGE CENTRE FOR QUALITY IMPROVEMENT

RC PSYCH
ROYAL COLLEGE OF PSYCHIATRISTS

Version 5 16/03/09 FK

You will be given a copy of this information sheet and the consent form to keep

INFORMATION SHEET – YOUNG PERSON'S INTERVIEW

This service is taking part in a research study which aims to look at admissions to a variety of in-patient mental health services. The study is being carried out and funded by 'QNIC', a network of in-patient Child & Adolescent Units which is organised by the Royal College of Psychiatrists' Research Unit in collaboration with King's College London, Institute of Psychiatry. The network looks at the quality of the service the unit provides and helps staff plan improvements for the future.

We are asking if you would take part in a research project to find out whether inpatient units are meeting the diverse needs of the young people who are admitted. Before you decide if you want to join in it's important to understand why the research is being done and what it will involve for you. Feel free to talk about it with your family, nurse, or doctor if you want to. Please ask us if there is anything you don't understand or if you would like further information. Thank you for reading this.

➢ What is the purpose of this study?

Previous research has suggested that some people who experience mental illness also engage in and/or are victims of antisocial behaviour or violence. The purpose of this research is to identify whether such service users have unmet needs in adolescent inpatient units. As each young person admitted to an inpatient ward is so different, and has such varying needs, we would like to find out more about you including; your mental health, any history of antisocial/aggressive behaviour, any history of victimisation, and what you like and dislike about the unit you are staying in. It is hoped that your views will help to determine how services develop in the future, so they better meet the needs of young people.

- **Why have I been chosen?**

We will be inviting all young people admitted to adolescent inpatient units over the next 12 months. You are one of 200 service users who will be invited to participate in our study.

- **Do I have to take part?**

No. It is up to you. If you do decide to take part, you will be asked to read and sign the attached consent form. If you agree to participate, we will contact you (via your key worker / nurse) to arrange a time and date to meet with the researcher. You are free to stop taking part at any time during the research without giving a reason. If you decide to stop, this will not affect the care and treatment you receive in any way.

- What will happen if I take part?

Participation involves completion of two brief questionnaires regarding your health at admission and discharge as well as a satisfaction survey at discharge. Your nurse will provide you with these materials. Also, a confidential interview will take place between you and a researcher lasting approximately 90 minutes. You will be asked questions about your mental health, behaviour, treatment and your views and experience of the service. With your permission, we will access your medical records and unit information (where it is relevant to this study). To help us remember we will tape record the interview (the tape recorder can be turned off at anytime during the interview if you so wish). We will also be speaking to your key worker/nurse and your parent/carer about your illness and your recent behaviour.

If you agree to participate in the interview you will receive a £10 voucher to compensate you for your time.

- **Will my information be kept confidential?**

The information that you give us will not be shared with anyone else and will be stored securely. Only a participant ID number, not your name, will appear on questionnaires and on data files. It will not be possible to identify any individual once the research is published. Information from the interview will only be shared with your clinical team if there is concern that there is an immediate risk of significant harm to yourself or others.

- What are the possible benefits of taking part?

We hope the information you provide might help other young people admitted to inpatient units in the future.

- ***Follow-up interview***

You may be invited to participate in a follow-up interview at a later date once you have been discharged from the unit. This will involve a shorter interview discussing your treatment, behaviour and needs since your discharge from the inpatient unit.

- What will happen with the findings of the research study?

Once all data has been collected and analysed, a final report will be produced and made available online at the College Website http://www.rcpsych.ac.uk/cru. All the information we include in the report will remain anonymous and it will not be possible to link any information to any particular person.

- **Who can I contact if I have any concerns or need further information?**

You can talk with your key worker/nurse, doctor or family if you have any concerns about the study, or you can contact us directly. If you do have any concerns or other questions about this study or the way it has been carried out, you should contact the chief investigator Farah Khalid. If you wish to make a complaint you may contact Peter Thompson, QNIC Programme Manager, at the address below. King's College London (KCL) are sponsors of the research and both KCL and The Royal College of Psychiatrists have professional indemnity insurance to cover this research.

Contact: **Farah Khalid at Royal College of Psychiatrists, Centre for Quality Improvement, QNIC, Standon House, 21 Mansell Street, London, E1 8AA.Tel: 020 7997 4970. Email fkhalid@cru.rcpsych.ac.uk**

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ADOLESCENT INPATIENT CARE EVALUATION

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COLLEGE CENTRE FOR QUALITY IMPROVEMENT

RC PSYCH
ROYAL COLLEGE OF PSYCHIATRISTS

Version 4 06/02/09 FK

You will be given a copy of the information sheet and the consent form to keep

YOUNG PERSON'S CONSENT FORM

Young Person's Copy

Please initial box

1. I have read the information sheet dated 16th March 2009 (version 5) for the above study. I have had the opportunity to consider the information and ask questions. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason, without my medical care or legal rights being affected ☐
3. I understand the study involves a confidential interview with the researcher. I agree to take part in the above study. ☐
4. I give permission for the researcher to access relevant sections of my medical records as well as other information such as unit records. ☐
5. I am happy for the interview to be tape-recorded ☐
6. I am happy for the researcher to speak with my parent/carer ☐
7. I am happy for the researcher to speak with my key worker/nurse ☐
8. I agree to be contacted in the future for a follow up interview ☐

_____	_____	_____
Name of young person	Date	Signature

I have explained the study to the participant and answered their questions honestly and fully

_____	_____	_____
Researcher	Date	Signature

Institute of Psychiatry
at The Maudsley

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University of London

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ADOLESCENT INPATIENT CARE EVALUATION

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Version 4 06/02/09 FK

You will be given a copy of the information sheet and the consent form to keep

YOUNG PERSON'S CONSENT FORM

Researcher's Copy

Please initial box

1. I have read the information sheet dated 16th March 2009 (version 5) for the above study. I have had the opportunity to consider the information and ask questions. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason, without my medical care or legal rights being affected ☐
3. I understand the study involves a confidential interview with the researcher. I agree to take part in the above study. ☐
4. I give permission for the researcher access relevant sections of my medical records as well as other information such as unit records. ☐
5. I am happy for the interview to be tape-recorded. ☐
6. I am happy for the researcher to speak with my parent/carer ☐
7. I am happy for the researcher to speak with my key worker/nurse ☐
8. I agree to be contacted in the future for a follow up interview. ☐

_____	_____	_____
Name of young person	Date	Signature

I have explained the study to the participant and answered their questions honestly and fully

_____	_____	_____
Researcher	Date	Signature

Appendix 4.2 – psychosis and CD sections from K-SADS PL

KSADS-PL psychosis screen interview questions

P	C	S	
( )	( )	( )	0 - No information.
( )	( )	( )	1 - Not present.
( )	( )	( )	2 - Subthreshold: Suspected or likely.
( )	( )	( )	3 - Threshold: Definitely present.

PAST: ☐ P ☐ C ☐ S

1. Hallucinations

Has there ever been a time when your mind played tricks on you? Sometimes children might hear voices or see things, or smell things that other people cannot hear, see or smell.
Has this ever happened to you? Tell me about it.

Has there ever been a time when you heard voices that other people could not hear?
What did you hear? What kind of things did you hear?
Did you ever hear music which other people could not?

Has there ever been a time when you saw things like people or figures that other people could not see? If yes ... can you tell me about it?
What did you see? How often did it happen? When did it happen?
Did this only happen at night while you were trying to sleep, or did it happen in the daytime too?

Has there ever been a time when you smelled things that other people can't smell or felt things that weren't there?

NOTE: IF HALLUCINATIONS POSSIBLY PRESENT, PRIOR TO SCORING THIS ITEM, ASSESS THE SUBJECT'S CONVICTION OF THE REALITY IF THE HALLUCINATIONS WITH THE PROBES BELOW.

What did you think it was?
Did you think it was your imagination or real?
Did you think it was real when you (heard, saw, etc.) it?

What did you do when you (heard, saw, etc.) it?
These voices you heard (or other hallucinations), did they occur when you were awake or asleep? Could it have been a dream?
Did they happen when you were falling asleep? Waking up? Only when it was dark? Did they happen at any other time also?
Were you sick with fever when they occurred?
Have you ever been drinking beer, wine, liquor? Or taking any drugs when it happened?
Was it like a thought or more like a voice (noise) or a vision?

NOTE: IF HALLUCINATIONS ARE PRESENT, *CAREFULLY ASSESS* TIMELINE TO DETERMINE IF IN RELATION TO MOOD SYMPTOMS OR INDEPENDENT OF MOOD SYMPTOMS. THIS WILL FACILITATE DIFFERENTIAL DIAGNOSIS.

NOTE: DO NOT RATE AS POSITIVE IF ONLY ENDORSES HAVING HEARD SOMEONE CALLING THEIR NAME OCCURRING ONLY ONCE OR TWICE.

DON'T RATE ILLUSIONS POSITIVELY. Illusions are defined as false perceptions based on a real sensory stimuli which is momentarily transformed. They frequently occur due to poor perceptual resolution (darkness, noisy locale) or inattention and they are immediately corrected when attention is focused on the external sensory stimulus or perceptual resolution improves.

NOTE: TAKE INTO ACCOUNT CULTURAL BACKGROUND OF THE SUBJECT.

2. Delusions

Have you ever had any ideas about things that you didn't tell anyone because you were afraid they might not understand?
What were they?
Do you have any secret thoughts? Tell me about them.
Have you ever believed in things that other people didn't believe in? Like what?

Ask about each of the delusions surveyed below:

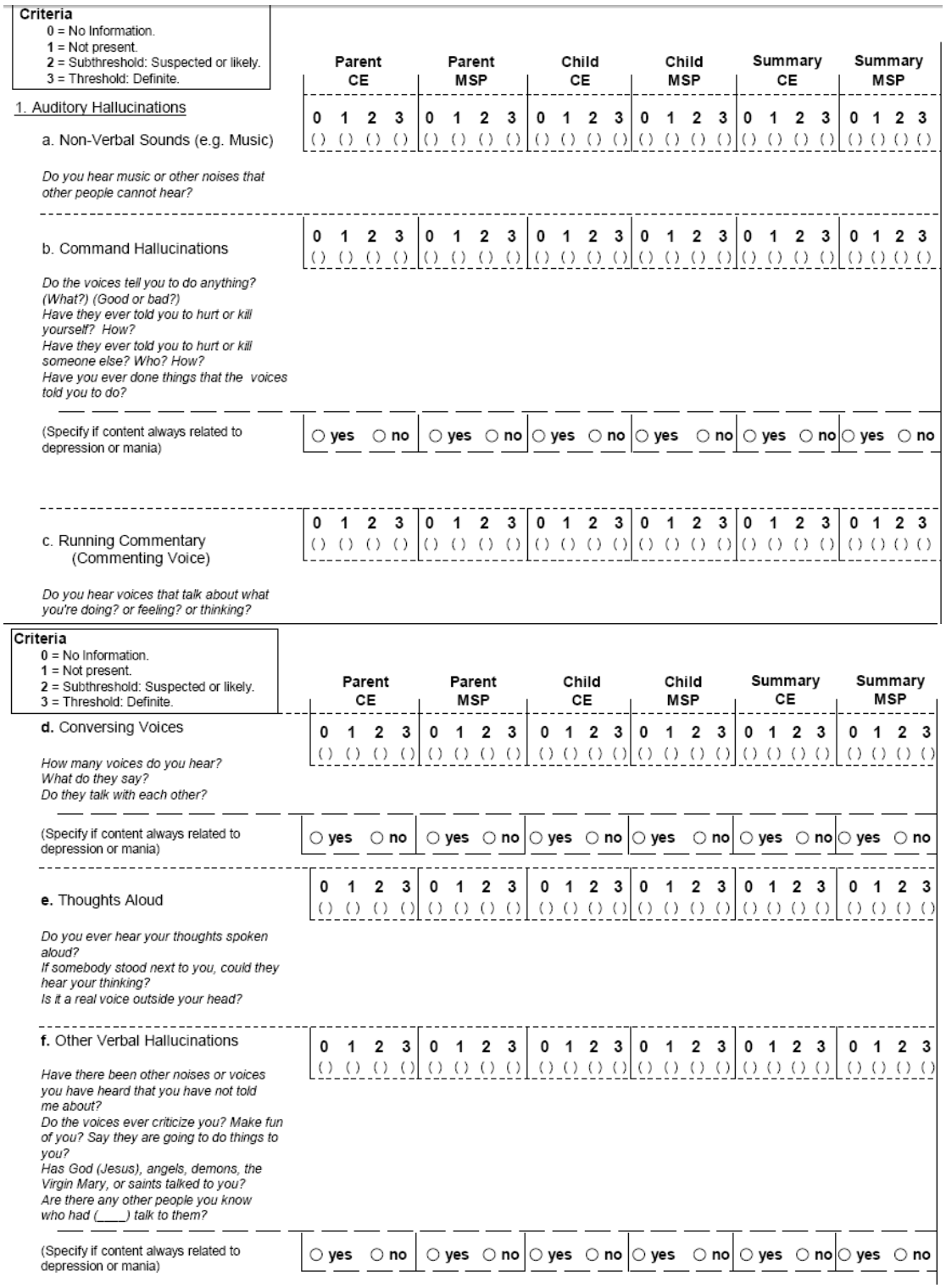
Has there ever been a time you felt that someone was out to hurt you or that someone was following you or spying on you? Who? Why?
Does anyone control your mind or body (like a robot)?
Did you ever think you were an important or great person?
Do you have any special powers?
When you are with people you do not know, do you think that they are talking about you?
Was there ever a time when you felt something was happening to your body? Like believing it was rotting from the inside, or that something was very wrong with it?
Did you ever feel convinced that the world was coming to an end?
How often did you think about _____?

NOTE: IF DELUSIONS ARE PRESENT, CAREFULLY ASSESS THE TIMELINE TO DETERMINE IF IN RELATION TO MOOD SYMPTOMS OR INDEPENDENT OF MOOD SYMPTOMS. THIS WILL FACILITATE THE DIAGNOSIS.

P	C	S	
( )	( )	( )	**0 -** No information.
( )	( )	( )	**1 -** Not present.
( )	( )	( )	**2 -** Subthreshold: Suspected or likely delusional.
( )	( )	( )	**3 -** Threshold: Definite delusions.

PAST: ☐ P ☐ C ☐ S

Psychotic disorders supplement questions



Criteria
0 = No Information.
1 = Not present.
2 = Subthreshold: Suspected or likely.
3 = Threshold: Definite.

	Parent CE	Parent MSP	Child CE	Child MSP	Summary CE	Summary MSP
1. Auditory Hallucinations						
a. Non-Verbal Sounds (e.g. Music)	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
Do you hear music or other noises that other people cannot hear?						
b. Command Hallucinations	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
Do the voices tell you to do anything? (What?) (Good or bad?) Have they ever told you to hurt or kill yourself? How? Have they ever told you to hurt or kill someone else? Who? How? Have you ever done things that the voices told you to do?						
(Specify if content always related to depression or mania)	○ yes ○ no	○ yes ○ no	○ yes ○ no	○ yes ○ no	○ yes ○ no	○ yes ○ no
c. Running Commentary (Commenting Voice)	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
Do you hear voices that talk about what you're doing? or feeling? or thinking?						

Criteria
0 = No Information.
1 = Not present.
2 = Subthreshold: Suspected or likely.
3 = Threshold: Definite.

	Parent CE	Parent MSP	Child CE	Child MSP	Summary CE	Summary MSP
d. Conversing Voices	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
How many voices do you hear? What do they say? Do they talk with each other?						
(Specify if content always related to depression or mania)	○ yes ○ no	○ yes ○ no	○ yes ○ no	○ yes ○ no	○ yes ○ no	○ yes ○ no
e. Thoughts Aloud	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
Do you ever hear your thoughts spoken aloud? If somebody stood next to you, could they hear your thinking? Is it a real voice outside your head?						
f. Other Verbal Hallucinations	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3	0 1 2 3
Have there been other noises or voices you have heard that you have not told me about? Do the voices ever criticize you? Make fun of you? Say they are going to do things to you? Has God (Jesus), angels, demons, the Virgin Mary, or saints talked to you? Are there any other people you know who had (____) talk to them?						
(Specify if content always related to depression or mania)	○ yes ○ no	○ yes ○ no	○ yes ○ no	○ yes ○ no	○ yes ○ no	○ yes ○ no

	Parent CE	Parent MSP	Child CE	Child MSP	Summary CE	Summary MSP
2. Location of Voices/Noises						
a. Inside Head Only *Where did the voices come from? From inside you head? Was it your thoughts you heard? Could other people hear the voices?*	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )
b. Outside Head Only *From outside your head, through your ears? Did it sound as clear as my voice does talking to you right now?*	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )
c. Combination *Have the voices sometimes seemed to be inside your head, and other times outside your head? Sometimes like thoughts and other times like my voice now?*	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )

Criteria
0 = No Information.
1 = Not present.
2 = Subthreshold: Suspected or likely.
3 = Threshold: Definite.

3. Visual Hallucinations *Do you see things other children don't? What do you see? Did you see something real, or was it just like a shadow moving? How clear was it? Did you see it several times for several days in a row?*	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )
(Specify if content always related to depression or mania)	○ yes ○ no	○ yes ○ no	○ yes ○ no	○ yes ○ no	○ yes ○ no	○ yes ○ no
4. Tactile Hallucinations *Do you ever feel like someone or something is touching you, but when you look there is nothing there? Tell me about it?*	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )
(Specify if content always related to depression or mania)	○ yes ○ no	○ yes ○ no	○ yes ○ no	○ yes ○ no	○ yes ○ no	○ yes ○ no
5. Olfactory Hallucinations *Do you ever smell things other people don't smell? What is it?*	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )
6. Illusions False perceptions stimulated by a real perception which is momentarily transformed. They occur frequently due to poor perceptual resolution (darkness, noisy locale) or inattention and they are immediately corrected when attention is focused on the external sensory stimulus or perceptual resolution improves. *Have you ever seen things around your room at night that you thought were something else? Like did you ever look at one of your stuffed animals or a shirt and think it was something that could get you? Have you ever looked at a rope and thought it was a snake? Other things?*	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )
7. Interviewer rating Considering all above items; are true hallucinations present?					0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )

Codes for Remaining Items: **0** = No Information **1** = No **2** = Yes

	Parent CE	Parent MSP	Child CE	Child MSP	Summary CE	Summary MSP
8. Cultural Acceptance of Hallucinations *Does anyone else in your family or any members of your church experience the same (specify hallucination)?*	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )
9. Duration of Hallucinations One or a combination of hallucinations lasted throughout the day for several days or several times a week for several weeks.	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )
10. Association with Affective Illness Hallucinations always occurred during or within 2 weeks of an affective illness Specify: (MDD, Mania or both)	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )
11. Association with Trauma Hallucinations themes reflect past traumatic experiences. Specify: _____	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )
12. Association with Substance Use or Medical Condition (high fever, seizure, medication) Hallucinations always occurred after substance use or in the course of a medical condition. Specify: _____	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )
13. Evidence of a Precipitant Specify: _____	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )
14. Duration of Symptoms one week or greater Specify Duration: [ ][ ] Weeks	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )

Criteria
0 = No Information
1 = Absent
2 = Subthreshold: Suspected or Likely
3 = Threshold: Definite

	Parent CE	Parent MSP	Child CE	Child MSP	Summary CE	Summary MSP
1. Grandiosity	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )
Do you feel that you are a very important person or that you have special powers or abilities? What are they? Are you related to important people like kings or the president or a sports figure? Do you have special powers like reading people's minds? Tell me more about it? Has God chosen you to perform any special tasks for Him?						
2. Guilt/Sin	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )
Do you ever feel like you did something terrible? What is the worst thing that you ever did? Do you deserve punishment?						
3. Delusions of Control	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )
Do you have the feeling that you are being controlled by some force or power outside yourself? Whose power? Do you feel sometimes that you are a puppet or a robot and can't control what you do? Or that you are forced to move or say things that you don't want to?						

Criteria
0 = No Information
1 = Absent
2 = Subthreshold: Suspected or Likely
3 = Threshold: Definite

	Parent CE	Parent MSP	Child CE	Child MSP	Summary CE	Summary MSP
4. Somatic Delusions	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )
Do you think you have any serious diseases? How do you know? Are you sure? Has something happened to your body or insides? Tell me about it. Maybe you just feel these things but nothing is wrong with you. Could that be?						
4a. Only during Affective Episode	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )
5. Nihilism	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )
Do you feel that something terrible will happen or has happened? What will happen? Have you felt that the world is coming to an end? When?						
6. Thought Broadcasting	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )
Do you ever feel that your thoughts are broadcast out loud so that other people know what you are thinking? Like on a radio, so that anyone listening could hear them? Have you actually heard your thoughts spoken out loud? Have others heard them?						

7. Thought Insertion *Do you feel that thoughts are put into your mind that are not your own? Who put them there? How? Why?*	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )
8. Thought Withdrawal *Have you had thoughts taken out of your mind by someone or some special force? Tell me what happened.*	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )
9. Message from TV/Radio *Does your TV or radio ever talk about you or send you messages? What about songs?*	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )

Criteria
0 = No Information
1 = Absent
2 = Subthreshold: Suspected or Likely
3 = Threshold: Definite

	Parent CE	Parent MSP	Child CE	Child MSP	Summary CE	Summary MSP
10. Delusions of Persecution *Has anyone been making things hard, or purposely causing you trouble, or trying to hurt you, or plotting against you? How come?*	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )
11. Delusions That Others Can Read His/Her Mind *Can people know what you are thinking in some strange way? Is that because of the way you look or is it just because they know what you are thinking because they can read your mind?*	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )
12. Delusions of Reference *Do people seem to drop hints about you? Do people say things with a double meaning? Do they do things in a special way to tell you something? Have things seemed especially arranged so only you understand the meaning?*	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )
14. Interviewer Rating Consider all above items: Are true delusions present?					0 1 2 3 ( ) ( ) ( ) ( )	0 1 2 3 ( ) ( ) ( ) ( )

Codes for Remaining Items: **0** = No Information **1** = No **2** = Yes

15. Subcultural or Family Delusions *Do other people in your family also believe in what you say (ask the mother and if necessary other members of the family)? Do other members of your religion believe in that too? Do other children like your friends believe in what you believe?*	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )

Codes for Remaining Items: **0** = No Information **1** = No **2** = Yes

	Parent CE	Parent MSP	Child CE	Child MSP	Summary CE	Summary MSP
16. Multiple Delusions	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )
17. Delusions always occured during or within 2 weeks of an affective illness. Specify: (MDD, Mania or Both) _____	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )
18. Delusions always occurred in the context of substance use or during the course of a medical illness.	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )
19. Content of Delusions always related to depressed or elated mood.	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )
20. Evidence of a Precipitant	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )
21. Duration of Symptoms one week or more. Specify Duration: [ ][ ][ ] Weeks	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )

Codes for Remaining Items: **0** = No Information **1** = No **2** = Yes

Rate based on observation during interview.

	Parent CE	Parent MSP	Child CE	Child MSP	Summary CE	Summary MSP
1a. Flat Affect Deficit in emotional contact not explainable by severe mood disturbance or preoccupation, i.e. even with adequate efforts on the part of the interviewer to establish appropriate emotional contact, the subject does not give back signs of emotional response such as occasional smiling, tearfulness, laughing, or looking directly at the interviewer. At the "moderate" level or above, there is flatness of affect as indicated by monotonous voice and facial expression lacking signs of emotion.	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )
1b. Inappropriate Affect Affect is incongruous with content of speech, for example, giggles while discussing reason for hospitalization. Do not include mere embarrassment or excessively strong affect, as when subject cries when discussing a minor disappointment. Incongruity does not mean excessive intensity but qualitative inconsistency with thought content and/or environmental circumstances.	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )

2a. Incoherence Speech that is generally not understandable, running together of thoughts or words with no logical or grammatical connections, resulting in disorganization. **Do not rate if due to learning disabilities, low IQ, or speech disorders.**	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
2b. Loosening of Associations Flow of thought in which ideas shift from one subject to another in a completely unrelated way. **Do not rate if due to learning disabilities, low IQ, or speech disorders.**	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
3. Catatonic Behavior Motor anomalies including immobility, stupor, rigidity, bizarre posturing, waxy flexibility, and excited movements (purposeless and stereotyped excited motor activity not influenced by external stimuli).	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )

IMPAIRED FUNCTIONING DURING ACTIVE ILLNESS

1. Impaired School Performance	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
2. Impaired Peer Relations	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
3. Impaired Family Relations	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
4. Impaired Self Care	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )

Conduct disorder screen interview questions

1. Lies

Everybody lies. Some kids tell lies to exaggerate, some kids tell lies to get out of trouble, while others tell lies to con/cheat others.

Do you ever tell lies?
What type of lies do you tell?
Who do you lie to?
Have people ever called you a liar?
What's the worst lie you ever told?
Did you lie to get other people to do things for you?
Did you lie to get out of paying people back money or some favor you owe them?
Has anyone ever called you a con?
Complained that you broke promises a lot?
How often did you lie?

NOTE: ONLY RATE POSITIVE EVIDENCE OF LYING TO CHEAT OR "CON."

P	C	S	
( )	( )	( )	**0** - No information.
( )	( )	( )	**1** - Not present.
( )	( )	( )	**2** - Subthreshold: Occasionally lies. Lies more often than a typical child his/her age.
( )	( )	( )	**3** - Threshold: Lies often, multiple times per week or more **(to con or cheat)**.

PAST: ☐ P ☐ C ☐ S

2. Truant

Has there ever been a time when you skipped a whole day of school when your parents didn't know about it?
Did you ever go to school and leave early when you were not really supposed to? How about going in late?
Did you sometimes miss or skip classes in the morning?
Did you get into trouble? How often?

For adolescents: *How old were you when you first started to play hooky?*

NOTE: ONLY RATE POSITIVE INCIDENTS OF TRUANCY BEGINNING BEFORE THE AGE OF 13. IN ADDITION, TRUANCY IS ACTIVELY MISSING PART OR ALL OF A SCHOOL DAY REGARDLESS OF PARENT ABILITY TO ENFORCE ATTENDANCE.

P	C	S	
( )	( )	( )	**0** - No information.
( )	( )	( )	**1** - Not present.
( )	( )	( )	**2** - Subthreshold: Truant on one isolated incident.
( )	( )	( )	**3** - Threshold: Truant on numerous occasions **(e.g. 2 or more days or numerous partial days)**.

PAST: ☐ P ☐ C ☐ S

3. Initiates Physical Fights

Has there ever been a time when you got into many fist fights?
Who usually started the fights?
What's the worst fight you ever got into? What happened? Did anyone get hurt?
Who did you usually fight with?
Have you ever hit a teacher? One of your parents? Another adult?
How often did you fight?
Have you ever tried or wanted to kill someone?

Are you or any of your friends in a gang? The Crypts? Bloods? Another gang?

NOTE: TAKE INTO ACCOUNT CULTURE, BACKGROUND, AND NEIGHBORHOOD.

P	C	S	
( )	( )	( )	**0** - No information.
( )	( )	( )	**1** - Not present.
( )	( )	( )	**2** - Subthreshold: Fights with peers only. No fight has resulted in serious injury to peer (e.g. no medical intervention required, stitches, etc.).
( )	( )	( )	**3** - Threshold: Reports at least one physical fight involving an adult (e.g. teacher, parent) OR reports starting frequent fights, with one or more fights resulting in serious injury to a peer, or frequent fights not resulting in injury (at least 1-2 times per month).

PAST: ☐ P ☐ C ☐ S

○ Check here if evidence of homicidal intent.
___ ___ ___ ___ ___ ___ ___ ___ ___ ___ -
○ Check here if evidence of gang involvement.

4. Bullies, Threatens, or Intimidates Others

Do you ever try to bully kids or threaten kids to get them to do something you want them to do?

How often did you do these things:
__ call names or make fun of other kids
__ threaten to hurt other kids
__ push
__ trip
__ come up from behind and slap or knock kids down
__ knock items out of kids hands
__ make other kids do things for you

NOTE: DO NOT COUNT TRIVIAL SIBLING RIVALRY.

P	C	S	
( )	( )	( )	**0** - No information.
( )	( )	( )	**1** - Not present.
( )	( )	( )	**2** - Subthreshold: Occasionally bullies, threatens, or intimidates.
( )	( )	( )	**3** - Threshold: Bullies, threatens, or intimidates others on multiple occasions, daily, almost daily, or at least several times per week.

PAST: ☐ ☐ ☐
P C S

5. Nonaggressive Stealing

In the past year, have you stolen anything?
What is the most expensive thing you stole?
What other things have you stolen? From whom? From which stores?
Have you stolen a toy from a store? Money from your mom? Anything else?
How often have you stolen things?

NOTE: ONLY COUNT THEFTS OF NON-TRIVIAL VALUE (e.g. $20.00 or more) . EXCEPTION: MULTIPLE THEFTS OUTSIDE THE HOME OF TRIVIAL VALUE.

P	C	S	
( )	( )	( )	**0** - No information.
( )	( )	( )	**1** - Not present.
( )	( )	( )	**2** - Subthreshold: Has stolen without confrontation of victim on only one occasion.
( )	( )	( )	**3** - Threshold: Has stolen without confrontation of victim on 2 or more occasions.

PAST: ☐ ☐ ☐
P C S

Conduct disorder supplement questions

1. Vandalism

Do you ever break other people's things on purpose? Like breaking windows? Kicking in doors, smashing windows, destroying school property?
Have you ever destroyed furniture, walls, floors, doors, etc. at home or school?
How about when you were very angry?
How often do you destroy others' property?

P	C	S	
( )	( )	( )	**0** - No Information.
( )	( )	( )	**1** - Not Present.
( )	( )	( )	**2** - Subthreshold: Minor acts of deliberate destruction of other people's property on rare occasions (e.g., breaks another's toy on purpose) OR one or two occasions of significant destruction of property.
( )	( )	( )	**3** - Threshold: Three or more instances of moderate to severe vandalism/destruction of property.

PAST: ☐ ☐ ☐
P C S

P C S

2. Breaking and Entering

In the past six months, have you or any of your friends broken into any cars? Houses? Any stores? Warehouses? Other buildings?
About how many times have you broken into a house, car, store, or other building?
Have you or any of your friends done any of the following:
Broken into houses; cars; other vehicles; abandoned houses or buildings; a store(s); a building(s)?

( ) ( ) ( )
( ) ( ) ( )
( ) ( ) ( )
( ) ( ) ( )

0 - No Information.
1 - Not Present.
2 - Subthreshold: Has been with friends who broke into a house, car, store, or building, but did not actively participate.
3 - Threshold: Has broken into a house, car, store, or building 1 or more times.

PAST: ☐ ☐ ☐
P C S

P C S

3. Aggressive Stealing

Have you or any of your friends robbed anyone?
Snatched their purse?
Held them up?
How often?

( ) ( ) ( )
( ) ( ) ( )
( ) ( ) ( )
( ) ( ) ( )

0 - No Information.
1 - Not Present.
2 - Subthreshold: Has been with friends who aggressively stole, but did not actively participate.
3 - Threshold: Mugging, purse-snatching, extortion, armed robbery, etc. on 1 or more occasions.

PAST: ☐ ☐ ☐

P C S

4. Firesetting

Have you set any fires?
Why did you set the fire?
Were you playing with matches and did you start the fire by accident, or did you start it on purpose?
Were you angry?
Were you trying to cause a lot of damage or to get back at someone?
What's the most damage you ever caused by starting a fire?
About how many fires have you set?

( ) ( ) ( )
( ) ( ) ( )
( ) ( ) ( )
( ) ( ) ( )

0 - No Information.
1 - Not Present.
2 - Subthreshold: Match/lighter play. No intent to cause damage, and fire(s) not started out of anger.
3 - Threshold: Set 1 or more fires with the intent to cause damage, or out of anger.

PAST: ☐ ☐ ☐
P C S

P C S

5. Often Stays out at Night

What time are you supposed to come home at night?
Do you often stay out past your curfew?
What is the latest you ever stayed out?
Have you ever stayed out all night?
How many times have you done that?

NOTE: ONLY RATE POSITIVE INCIDENTS OF STAYING OUT IF IT BEGINS BEFORE THE AGE OF 13.

( ) ( ) ( )
( ) ( ) ( )
( ) ( ) ( )
( ) ( ) ( )

0 - No Information.
1 - Not Present.
2 - Subthreshold: Stayed out all night, or several hours past curfew, on 1-2 isolated occasions (despite parent's prohibitions).
3 - Threshold: Stayed out all night, or several hours past curfew, on several occasions (3 or more times).

PAST: ☐ ☐ ☐
P C S

6. Ran Away Overnight

Have you ever run away? Why?
Was there something going on at home that you were trying to get away from?
How long did you stay away?
How many times did you do this?

NOTE: DO NOT SCORE POSITIVELY IF CHILD RAN AWAY TO AVOID PHYSICAL OR SEXUAL ABUSE.

P	C	S	
( )	( )	( )	**0 -** No Information.
( )	( )	( )	**1 -** Not Present.
( )	( )	( )	**2 -** Subthreshold: Ran away overnight only one time, or ran away for shorter periods of time on several occasions.
( )	( )	( )	**3 -** Threshold: Ran away overnight 2 or more times or once for at least 2 or more nights (lengthy period of time).

PAST: ☐ P ☐ C ☐ S

7. Use of a Weapon

Have you ever used an object or item to hit/hurt someone?
Have you ever carried a weapon?
Have you ever used or threatened to use:
____kitchen knife or pocket knife
____gun
____brick, rocks
____broken bottles
What about in self defense?

P	C	S	
( )	( )	( )	**0 -** No Information.
( )	( )	( )	**1 -** Not Present.
( )	( )	( )	**2 -** Subthreshold: Has threatened use of a weapon, but has never used one.
( )	( )	( )	**3 -** Threshold: Used a weapon that can cause serious harm on 1 or more occasions (e.g., knife, brick, broken bottle, gun).

PAST: ☐ P ☐ C ☐ S

8. Physical Cruelty to Persons

Have you ever beaten someone up for no reason?
How bad?
Was it just because the other person was different than you or because of the way they looked?
Did they get hurt?

NOTE: DO NOT COUNT TRIVIAL SIBLING RIVALRY.

P	C	S	
( )	( )	( )	**0 -** No Information.
( )	( )	( )	**1 -** Not Present.
( )	( )	( )	**2 -** Subthreshold: Has threatened physical cruelty on one or more occasions.
( )	( )	( )	**3 -** Threshold: Has been physically cruel to an individual on one or more occasions causing significant injury.

PAST: ☐ P ☐ C ☐ S

9. Forced Sexual Activity

Have you ever forced anyone to kiss you or touch you in your private parts?
Have you every forced another kid to touch you outside your clothes?
Has anyone ever said you forced another kid/person to go farther than they wanted? What did they say?

P	C	S	
( )	( )	( )	**0 -** No Information.
( )	( )	( )	**1 -** Not Present.
( )	( )	( )	**2 -** Subthreshold: Forced or attempted to force someone to participate in sexual activity on one or more occasions.
( )	( )	( )	**3 -** Threshold: Forced someone to participate in sexual activity (ex: non-genital fondling, over/under clothing), genital fondling, oral sex, vaginal intercourse and/or anal intercourse on one or more occasions.

PAST: ☐ P ☐ C ☐ S

10. Cruelty to Animals

Some kids like to hurt or torture animals. Have you hurt or tried to hurt an animal on purpose? What did you do?
About how many times have you hurt an animal on purpose in the last six months?

NOTE: DO NOT SCORE TRADITIONAL HUNTING OUTINGS. PAY CAREFUL ATTENTION TO THE COMMUNITY SETTING (RURAL, FARM, ETC.).

P	C	S
( )	( )	( )
( )	( )	( )
( )	( )	( )
( )	( )	( )

0 - No Information.
1 - Not Present.
2 - Subthreshold: Has killed or tortured an animal on only one occasion.
3 - Threshold: Has killed or tortured an animal on 2 or more occasions.

PAST: ☐ P ☐ C ☐ S

Codes for Remaining Items: **0** = No Information **1** = No **2** = Yes

Criteria		Parent CE	Parent MSP	Child CE	Child MSP	Summary CE	Summary MSP
11. Impairment							
A. Socially (with peers):		0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )
B. With family:		0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )
C. In school:		0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )
12. Duration *For how long did you (list positively endorsed conduct symptoms)?* **NOTE: PER THE DSM-IV, "the Conduct Disorder diagnosis should be applied only when the behavior in question is symptomatic of an underlying dysfunction within the individual and not simply a reaction to the immediate social context."**	6 months or more	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )
13. Childhood Onset Type *How old were you when you first started to (list positively endorsed items)?*	Onset of at least one conduct problem prior to age 10	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )
14. Adolescent Onset Type *You didn't do any of these things before you were 10?*	No conduct problems prior to age 10	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )	0 1 2 ( ) ( ) ( )

Appendix 4.3 - Pro forma for data extraction from medical notes*

*If something not noted enter 999

Researcher Number		
Participant Number		
DOB	DD/MM/YYYY	
Name of ward	A	1
	B	2
	C	3
	D	4
	E	5
	F	6
	G	7
	H	8
	I	9
	J	10
Population of ward	General	1
	Acute	2
	MSU	3
Type of ward - NHS vs. Independent	NHS	0
	Independent	1
Date of admission	DD/MM/YYYY	
Date of discharge	DD/MM/YYYY	
Legal Status	None/Informal	0
	2	1
	3	2
	35	3
	37	4
	38	5
	48/49	6
	48/479	7
	37/41	8
	47/49	9
Diagnosis1	Enter ICD 10 code or DSM IV label	
Diagnosis2	Enter ICD 10 code or DSM IV label	
Diagnosis3	Enter ICD 10 code or DSM IV label	
Diagnosis4	Enter ICD 10 code or DSM IV label	
Diagnosis4	Enter ICD 10 code or DSM IV label	
Previous diagnosis	Enter ICD 10 code or DSM IV label	
Previous diagnosis	Enter ICD 10 code or DSM IV label	

Previous diagnosis	Enter ICD 10 code or DSM IV label	
Duration of disorder (1)	No psychiatric disorder	0
	LE 6 months	1
	> 6 < 12 months	2
	>= 1 yr < 2 yr	3
	>= 2 yr < 3 yr	4
	>= 3 yr < 4yr	5
	>=4 yr <5 yr	6
	>=5 yrs	7
	Not known	8
Duration of disorder (2)	No psychiatric disorder	0
	LE 6 months	1
	> 6 < 12 months	2
	>= 1 yr < 2 yr	3
	>= 2 yr < 3 yr	4
	>= 3 yr < 4yr	5
	>=4 yr <5 yr	6
	>=5 yrs	7
	Not known	8
Duration of disorder (3)	No psychiatric disorder	0
	LE 6 months	1
	> 6 < 12 months	2
	>= 1 yr < 2 yr	3
	>= 2 yr < 3 yr	4
	>= 3 yr < 4yr	5
	>=4 yr <5 yr	6
	>=5 yrs	7
	Not known	8
Developmental Impairment	No	0
	Yes	1
Schooling	Not at school dropped out	0
	Regular school/college	1
	Special Needs School	2
	Pupil Referral Unit/emotional & beh difficulties school	3
	Other	4
Current Parental Situation	With two natural/adoptive parents	0
	Mother alone	1
	Father alone	2
	Mother and other	3
	Father and other	4
	Neither parent but relatives	5

	Foster/adoption/non-relative	6
	Institution	7
	other	8
Previous CAMHS involvement	No	0
	Yes	1
Referred from or transferred from where?	Outpatient CAMHS	0
	GAU	1
	AMH	2
	Prison	3
	Police	4
	Secure home	5
	Care home	6
	Secure unit	7
	General hospital	8
Previous inpatient stay	No	0
	Yes	1
Fighting, bullying, aggression	Not present	0
	Present	1
Duration of fighting/bullying/aggression	LE 6 months	0
	> 6 < 12 months	1
	>= 1 yr < 2 yr	2
	>= 2 yr < 3 yr	3
	>= 3 yr < 4yr	4
	>=4 yr <5 yr	5
	>=5 yrs	6
Violent assault, stabbing, severe assault	No	0
	Yes	1
If yes, duration of severe violence	LE 6 months	0
	> 6 < 12 months	1
	>= 1 yr < 2 yr	2
	>= 2 yr < 3 yr	3
	>= 3 yr < 4yr	4
	>=4 yr <5 yr	5
	>=5 yrs	6
Forensic History	No	0
	Yes	1
If yes, duration of severe violence	LE 6 months	0
	> 6 < 12 months	1
	>= 1 yr < 2 yr	2
	>= 2 yr < 3 yr	3
	>= 3 yr < 4yr	4
	>=4 yr <5 yr	5
	>=5 yrs	6

Number of offences		
YOT	No	0
	Yes	1
YOI	No	0
	Yes	1
Family Mental Illness (1)	No	0
	Yes	1
If yes, who:	Parents	0
	Sibling	1
	Cousin	2
	Grandparent	3
	Other	4
Family Mental Illness (2)	No	0
	Yes	1
If yes, who:	Parents	0
	Sibling	1
	Cousin	2
	Grandparent	3
	Other	4
Family Mental Illness (3)	No	0
	Yes	1
If yes, who:	Parents	0
	Sibling	1
	Cousin	2
	Grandparent	3
	Other	4
If yes, indicate which MI (1)	Schizophrenia/ Psychosis	0
	Depression	1
	Bipolar disorder	2
	ADHD	3
	CD	4
	Alcohol dependence	5
	Drug dependence	6
	Personality Disorder	7
	Disorder not known	8
If yes, indicate which MI (2)	Schizophrenia/ Psychosis	0
	Depression	1
	Bipolar disorder	2
	ADHD	3
	CD	4
	Alcohol dependence	5
	Drug dependence	6
	Personality Disorder	7

	Disorder not known	8
If yes, indicate which MI (3)	Schizophrenia/ Psychosis	0
	Depression	1
	Bipolar disorder	2
	ADHD	3
	CD	4
	Alcohol dependence	5
	Drug dependence	6
	Personality Disorder	7
	Disorder not known	8
Family Violence (1)	Not present	0
	Present	1
If yes, who:	Parents	0
	Sibling	1
	Cousin	2
	Grandparent	3
	Other	4
If yes - violent or non-violent	Non-violent	0
	Violent	1
	Both	2
Family Violence (2)	Not present	0
	Present	1
If yes, who:	Parents	0
	Sibling	1
	Cousin	2
	Grandparent	3
	Other	4
If yes - violent or non-violent	Non-violent	0
	Violent	1
	Both	2
Family Violence (3)	Not present	0
	Present	1
If yes, who:	Parents	0
	Sibling	1
	Cousin	2
	Grandparent	3
	Other	4
If yes - violent or non-violent	Non-violent	0
	Violent	1
	Both	2
Maltreatment	Not present	0
	Present	1
Social services involvement	No	0

	Yes		1
Psychotic symptoms – current/past			
1. Hallucinations	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
2. Delusions	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
1. Auditory Hallucinations a. Non-Verbal Sounds (e.g. Music)	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
b. Command Hallucinations	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
c. Running Commentary (Commenting Voice)	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
d. Conversing Voices	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
e. Thoughts Aloud	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
f. Other Verbal Hallucinations	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
2. Location of Voices/Noises a. Inside Head Only	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
b. Outside Head Only	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
c. Combination	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
3. Visual Hallucinations	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
4. Tactile Hallucinations	**Current**	**Past**	
	No	No	0
	Yes	Yes	1

5. Olfactory Hallucinations	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
6. Illusions	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
8. Cultural Acceptance of Hallucinations	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
10. Association with Affective Illness	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Specify:			
11. Association with Trauma	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Specify:			
12. Association with Substance Use or Medical Condition	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Specify:			
13. Evidence of a Precipitant	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Specify:			
1. Grandiosity	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
2. Guilt/Sin	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
3. Delusions of Control	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
4. Somatic Delusions	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
4a. Only during Affective Episode	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
5. Nihilism	**Current**	**Past**	
	No	No	0

	Yes	Yes	1
6. Thought Broadcasting	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
7. Thought Insertion	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
8.Thought Withdrawal	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
9. Message from TV/Radio	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
10. Delusions of Persecution	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
11. Delusions That Others Can Read His/Her Mind	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
12. Delusions of Reference	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
13. Other Bizarre Delusions	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
15. Subcultural or Family Delusions	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
16. Multiple Delusions	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
17. Delusions always occurred during or within 2 weeks of an affect	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Specify: (MDD, Mania or Both)	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
18.Delusions always occurred in the context of substance use	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
19. Content of Delusions always related to depressed or elated mood	**Current**	**Past**	

	No	No	0
	Yes	Yes	1
20. Evidence of a Precipitant	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
1a. Flat Affect	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
1b. Inappropriate Affect	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
2a. Incoherence	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
2b. Loosening of Associations	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
3. Catatonic Behaviour	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
1. Impaired School Performance	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
2. Impaired Peer Relations	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
3. Impaired Family Relations	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
4. Impaired Self Care	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Pseudo-hallucinations	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
ODD current and past behaviours			
Loses Temper	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Argues A Lot With Adults	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Disobeys Rules A Lot/Defies or refuses to	**Current**	**Past**	

comply with adult regulations			
	No	No	0
	Yes	Yes	1
Easily Annoyed	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Angry or Resentful	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Spiteful and Vindictive	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Annoys People on Purpose	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Blames Others for Own Mistakes	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
ODD - Duration	**Current**	**Past**	
	<6 months	<6 months	0
	>=6 months	>=6 months	1
ODD - Evidence of Precipitant	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Specify			
ODD - Impairment - With parents	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
ODD - Impairment - With other adult family members	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
ODD - Impairment - In school	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
ODD - Impairment - In community settings	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
ODD - Impairment - With peers	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
CD current and past behaviours			
Lies	**Current**	**Past**	

	No	No	0
	Yes	Yes	1
Truant	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Initiates Physical Fights	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Check here if evidence of homicidal intent	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Check here if evidence of gang involvement	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Bullies, Threatens, or Intimidates Others	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Non-aggressive Stealing	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Vandalism	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Breaking and Entering	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Aggressive Stealing	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Fire-setting	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Often Stays out at Night	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Ran Away Overnight	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Use of a Weapon	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Physical Cruelty to Persons	**Current**	**Past**	
	No	No	0

	Yes	Yes	1
Forced Sexual Activity	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Cruelty to Animals	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
CD - Impairment - Socially	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
CD - Impairment - With family:	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
CD - Impairment - In school:	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
CD - Duration	**Current**	**Past**	
	<6 months	<6 months	0
	>=6 months	>=6 months	1
Childhood-Onset Type	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Adolescent-Onset Type	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Mild	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Moderate	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Severe	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Alcohol Misuse	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Substance Misuse (1)	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Substance Misuse Type	**Current**	**Past**	
	Cannabis	Cannabis	0
	Stimulants	Stimulants	1

	Sedatives	Sedatives	2
	Cocaine	Cocaine	3
	Opioids	Opioids	4
	PCP	PCP	5
	Hallucinogens	Hallucinogens	6
	Solvents/ Inhalents	Solvents/ Inhalents	7
	Other	Other	8
If other, specify			
Substance Misuse (2)	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Substance Misuse Type	**Current**	**Past**	
	Cannabis	Cannabis	0
	Stimulants	Stimulants	1
	Sedatives	Sedatives	2
	Cocaine	Cocaine	3
	Opioids	Opioids	4
	PCP	PCP	5
	Hallucinogens	Hallucinogens	6
	Solvents/ Inhalents	Solvents/ Inhalents	7
	Other	Other	8
If other, specify			
Substance Misuse (3)	**Current**	**Past**	
	No	No	0
	Yes	Yes	1
Substance Misuse Type	**Current**	**Past**	
	Cannabis	Cannabis	0
	Stimulants	Stimulants	1
	Sedatives	Sedatives	2
	Cocaine	Cocaine	3
	Opioids	Opioids	4
	PCP	PCP	5
	Hallucinogens	Hallucinogens	6
	Solvents/ Inhalents	Solvents/ Inhalents	7
	Other	Other	8
If other, specify			
Medication compliance	**Current**	**Past**	
	No	No	0
	Yes	Yes	1

Any other information considered relevant		

Appendix 5.1 – Group contrasts within unit type - GAU and MSU

Table 5.14 *Co-occurring vs. psychosis-only by unit type:* child & family demographics

	General Adolescent Unit			Medium Secure Unit	
	Co-occurring (N=27) (%)	**Psychosis only (N=17)** (%)	**Odds Ratio (95% CI)**	**Co-occurring (N=32)** (%)	**Psychosis only (N=3)** (%)
Sex - Male	68.7	41.2	0.35 (0.09 - 1.23)	66.7	100
Age - Years, Mean (SD)	17.1 (1.0)	17.1(0.7)	1.20 (0.40 - 3.60)	17.4 (0.9)	17.7 (0.6)
Ethnicity					
White‡	44.4	23.5	--	81.3	100.0
Non-white	55.6	76.5	0.48 (0.12 - 1.97)	18.7	0.0
Family situation					
Living with family members	85.2	94.1	--	46.9	66.7
Living without family members	14.8	5.9	2.88 (0.27 - 30.1)	53.1	33.3
Developmental Impairment	8.0	5.9	1.53 (0.11 - 20.4)	26.1	100.0
School Suspension/Expulsion	59.3	35.3	2.53 (0.69 - 9.33)	96.9	0.0

‡taken as reference *p < 0.05 ** p < 0.01 *** p < 0.001

Table 5.15 *Co-occurring vs. psychosis-only by unit type:* service contact and medication compliance

	General Adolescent Unit			Medium Secure Unit	
	Co-occurring (N=27) *(%)*	***Psychosis only (N=17)*** *(%)*	**Odds Ratio (95% CI)**	***Co-occurring (N=32)*** *(%)*	***Psychosis only (N=3)*** *(%)*
Sector					
NHS	66.7	41.2	--	46.9	66.7
Independent	33.3	58.8	0.35 (0.09 - 1.29)	53.1	33.3
Mode of Referral					
Non-Criminal Justice	88.9	88.2	--	25.0	33.3
Criminal Justice	11.1	11.7	0.76 (0.09 - 6.57)	75.0	66.7
MHA Status					
Informal	33.3	70.6	--	0.0	0.0
Compulsory Detention	66.7	29.4	1.43 (0.35 - 5.91)	100.0	100.0
Previous Contact with Mental Health Services					
Outpatient	85.2	76.5	1.71 (0.35 - 8.49)	90.6	66.7
Mean Age	14.2 (2.7)	15.1 (1.8)	2.01 (0.44 - 9.09)	12.6 (3.8)	15 (0.0)
Inpatient	63.0	76.5	0.59 (0.14 - 2.48)	65.6	66.7
Mean Age	16.1 (1.1)	16.2 (0.8)	0.65 (0.12 - 3.49)	15.7 (1.2)	16.0 (1.4)
Medication Compliance	69.2	87.5	0.31 (0.05 - 1.79)	54.8	100.0

*p < 0.05 ** p < 0.01 *** p < 0.001

Table 5.16 *Co-occurring vs. psychosis-only by unit type*: other antisocial behaviours and behaviour history

	General Adolescent Unit			Medium Secure Unit	
	Co-occurring (N=27)	***Psychosis only (N=17)***	**Odds Ratio (95% CI) / Mann–Whitney / χ^2**	***Co-occurring (N=32)***	***Psychosis only (N=3)***
Non-aggressive antisocial behaviour *(mean, SD)*					
Oppositional behaviour	4.2 (2.4)	0.9 (1.6)	15.9 (3.89 - 65.2)***	5.4 (1.8)	0.6 (1.1)
Non-aggressive CD behaviours	2.6 (2.2)	0.3 (0.8)	15.4 (3.54 - 67.1)***	5.3 (2.0)	1.0 (1.0)
DSM – destruction of property	0.7 (0.8)	0.0	Z = -3.49 p<0.001	1.3 (0.6)	0.7 (0.6)
DSM - deceitfulness or theft	0.9 (1.0)	0.2 (0.4)	5.10 (1.14 - 22.8)*	1.8 (0.8)	0.3 (0.6)
DSM – serious violation of rules	0.8 (0.9)	0.2 (0.5)	9.75 (1.79 - 53.2)**	1.7 (1.0)	0.0
Forensic History / Past offending *(%)*	29.6	5.9	5.31 (0.50 - 56.5)	90.6	33.3
ICU Score: self-report *(mean, SD)*					
Total	27.3 (11.1)	23.7 (7.5)	1.72 (0.54 - 5.52)	30.3 (11.0)	11.7 (2.1)
Callous	8.6 (5.3)	5.1 (3.3)	4.08 (1.21 -13.8)*	10.5 (6.1)	3.0 (1.7)
Uncaring	9.8 (5.7)	11.4 (4.0)	0.47 (0.14 - 1.52)	12.0 (5.4)	4.7 (1.5)
Unemotional	9.0 (3.5)	7.2 (3.5)	2.37 (0.74 - 7.64)	7.8 (2.9)	4.0 (1.0)
Substance abuse *(%)*					
Alcohol	25.9	11.8	2.50 (0.42 -14.8)	62.5	0.0
Drugs	50.0	29.4	2.19 (0.54 - 8.91)	71.9	33.3
Duration of Physical Aggression					
No aggression	0.0	100.0	--	0.0	100.0
<=1 year‡	51.8	0.0	--	3.13	0.0
> 1 year & <=3 years	22.2	0.0	--	3.13	0.0
> 3 years	25.9	0.0	χ^2 (3) = 44.0 p<0.001	93.7	0.0
Onset of Conduct Disorder					
No CD	51.8	100.0	--	9.4	100.0
Child onset CD symptoms	11.1	0.0	--	37.5	0.0
Adolescent onset CD symptoms	37.0	0.0	χ^2 (2) = 11.6 p<0.01	53.1	0.0

*p < 0.05 ** p < 0.01 *** p < 0.001

Table 5.17 *Co-occurring vs. psychosis-only by unit type:* other comorbid symptoms and illness duration

	General Adolescent Unit			Medium Secure Unit	
	Co-occurring *(**N=27**)* *(mean, SD)*	***Psychosis only*** *(**N=17**)* *(mean, SD)*	**Odds Ratio (95% CI) / Mann–Whitney**	***Co-occurring*** *(**N=32**)* *(mean, SD)*	***Psychosis only*** *(**N=3**)* *(mean, SD)*
Depressive Symptoms - current	6.8 (6.3)	4.5 (6.1)	3.66 (0.96 - 14.0)	5.6 (6.6)	5.7 (5.5)
Depressive Symptoms - past	2.7 (5.4)	1.3 (3.7)	1.86 (0.38 - 9.09)	3.1 (4.6)	3.7 (6.3)
Mania Symptoms - current	2.2 (4.3)	1.3 (2.9)	2.35 (0.54 - 10.2)	1.3 (2.2)	0.0
Mania Symptoms - past	0.8 (2.8)	0.5 (1.4)	1.62 (0.21 - 12.6)	0.2 (0.6)	0.0
Panic attack symptoms – current	1.7 (0.8)	1.3 (0.6)	3.61 (0.93 - 13.9)	1.3 (0.6)	2.3 (1.1)
Panic attack symptoms – past	1.1 (0.4)	1.2 (0.7)	0.62 (0.08 - 4.58)	1.4 (0.7)	1.3 (0.6)
Social phobia symptoms – current	1.5 (0.7)	1.6 (0.7)	0.67 (0.19 - 2.30)	1.3 (0.6)	2.0 (1.0)
Social phobia symptoms – past	1.0 (0.2)	1.0 (0.0)	Z = -0.79 p=0.43	1.1 (0.2)	1.3 (0.6)
Anxiety symptoms – current	5.1 (1.8)	4.58 (1.8)	1.65 (0.53 - 5.15)	4.6 (1.9)	5.3 (1.5)
Anxiety symptoms – past	3.5 (1.0)	3.1 (0.4)	3.89 (0.41 - 37.2)	3.3 (0.8)	5.0 (2.0)
PTSD symptoms	2.2 (1.7)	1.6 (1.4)	1.76 (0.57 - 5.40)	2.8 (1.6)	1.3 (2.3)
Total psychotic symptoms - current	9.3 (5.5)	6.6 (5.6)	2.50 (0.66 - 9.41)	6.2 (4.2)	4.3 (3.0)
Total psychotic symptoms - past	0.3 (0.7)	1.1 (2.2)	0.33 (0.07 - 1.57)	0.7 (1.1)	0.0
Hallucinatory Symptoms - current	4.4 (3.4)	3.7 (3.1)	1.19 (0.34 - 4.23)	3.5 (2.8)	3.7 (3.2)
Hallucinatory Symptoms - past	0.1 (0.4)	0.6 (1.4)	0.11 (0.01 -1.85)	0.4 (0.9)	0.0
Delusional Symptoms - current	4.7 (3.0)	3.1 (3.0)	2.56 (0.78 - 8.39)	2.8 (2.3)	0.7 (0.6)
Delusional Symptoms - past	0.2 (0.4)	0.5 (0.9)	0.36 (0.08 - 1.69)	0.2 (0.4)	0.0
TCO symptoms - current	1.1 (0.8)	0.4 (0.7)	5.39 (1.43 - 20.2)**	0.9 (0.8)	0.0
Duration of psychosis (%)					
<12 months	74.1	88.2	--	34.4	33.3
>= 1 year	25.9	11.8	2.83 (0.48 - 16.4)	65.6	66.7
Duration of any disorder (%)					
<12 months	63.0	82.4	--	21.9	33.3
>= 1 year	37.0	17.6	2.71 (0.60 - 12.3)	78.1	66.7

*p < 0.05 ** p < 0.01 *** p < 0.001

Table 5.18 *Co-occurring vs. psychosis-only by unit type*: family history & psychosocial adversity

	General Adolescent Unit			**Medium Secure Unit**	
	Co-occurring ***(N=27)*** *(%)*	***Psychosis only*** ***(N=17)*** *(%)*	**Odds Ratio (95% CI) / χ^2**	***Co-occurring*** ***(N=32)*** *(%)*	***Psychosis only*** ***(N=3)*** *(%)*
Mental disorder present in other family members	44.4	70.6	0.37 (0.09 - 1.38)	71.0	33.3
Aggression / Violence present in other family members	25.9	0.0	$\chi^2(1) = 5.24$ p<0.05	59.4	66.7
Social services contact	44.4	5.9	11.8 (1.29 – 108.0)*	71.0	33.3
Maltreatment	48.1	35.2	1.90 (0.49 - 7.26)	68.7	33.3
Bullied	33.3	52.9	0.43 (0.11 - 1.62)	50.0	66.7
Victim of aggressive behaviour (in the last year) *(mean, SD)*	1.4 (1.7)	0.3 (0.7)	5.89 (1.34 - 25.8)*	1.5 (1.9)	2.0 (1.7)

*p < 0.05 ** p < 0.01 *** p < 0.001